

**DRAINAGE REPORT**  
for  
**189 MAY ST, WORCESTER, MA**

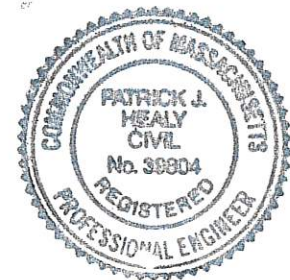
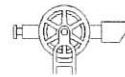
Job #348-1876 Client #3368

September 14, 2021

**THOMPSON-LISTON**  
**ASSOCIATES, INC.**

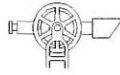
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*Patrick J. Healy 9/14/21*

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## **Drainage Report** for **New England Rehabilitation Services of Central Massachusetts, Inc.** **Proposed redevelopment of the site at 189 May Street Worcester, Massachusetts**

**September 14, 2021**

### **Project Description**

The site is located on the south-westerly side of May Street, south-easterly of Fairlawn Drive and north-westerly of Hadwen Arboretum at Clark University. The property is presently owned by New England Rehabilitation Services of Central Massachusetts, INC. It presently serves as a hospital.

The Applicant, New England Rehabilitation Services of Central Massachusetts, Inc., proposes to construct an addition onto the existing north wing of the hospital with associated ambulance access bay, walkway and entryway for pedestrian use, and several new islands and parking reconfiguration in order to allow for safe and efficient flow of vehicle and pedestrian traffic. On the southerly side of the site, additional landscaped area and walkways are proposed leading to an existing gazebo. On the westerly side of the site, existing pavement is proposed to be removed in order to plant additional grass.

This report compares the drainage conditions of the proposed development to the predevelopment conditions of the site. The predevelopment condition includes the most recent improvements that were made to the site in the 2004-2005 time frame, when the parking lot was expanded and the drainage system was improved.

Soils on this site are categorized on the United States Department of Agriculture (USDA) Web Soil Survey soil maps as being "Paxton fine sandy loam" soils with 3 to 8 percent slopes in most areas and 8 to 15 percent slopes in remaining areas. In actuality, the geotechnical borings show an underlying soils with fines in the range of 15% to 40%. As with some other hilltop sites in the area, the glacial till in these situations is very dense, and with the high percentage of fines is highly expansive with frost. The site soils are unsuitable for any type of infiltration systems. For the purpose of the drainage study, we have categorized the soils as hydrologic soil group "C" soils based on the soil maps and properties of the Paxton soils.

### **Methodology**

In order to evaluate the existing and proposed hydrologic conditions of the site, we have employed the HydroCAD™ stormwater modeling software, which emulates the United States Department of Agriculture, Soil Conservation Service (SCS) hydrograph method as outlined in Technical Release 20 (1982). We have used the SCS modified soil cover complex method of evaluating cover conditions and underlying soil features in developing runoff curve numbers (RCN), and have determined Times of Concentration (ToC), using the methods described in the SCS's National Engineering Handbook, Section 4, Hydrology (1985). Each watershed with its Area, RCN and ToC, is described as a "Subcatchment" in HydroCAD™.

HydroCAD™ uses the Storage-Indication method for routing flows from “Subcatchment” areas through “Reaches” and “Ponds.” Reaches are overland flow paths, pipe segments, or stream segments. Ponds are areas that collect water, such as basins, ponds, or swales where outlet devices control outflow.

Rainfall was determined from the maps in the National Oceanic and Atmospheric Administration (NOAA), ATLAS 14 Point Precipitation Frequency Estimates for the locus. The SCS’s Type III Rainfall Distribution is used for these calculations and is described in SCS Technical Release 55 (1986). The 2-, 10-, 25- and 100-year return frequency storms were studied with 24-hour rainfalls of 3.14, 4.87, 5.95 and 7.61 inches respectively.

### **Design Points**

The design points for this report consist of the northerly pond that the swale leads into, the slope that runs westerly before the start of the swale, the catch basin on the driveway near the entrance to the northerly parking, and the abutting easterly parking lot that collects runoff from the slope near the gazebo. These locations were chosen because they are locations where runoff from the site ends up and they can be compared for pre- and post-development.

Flows to the northerly pond are modeled as pond #1P in the pre- and post-development conditions. Flows to the westerly slope are modeled as Subcatchment 7 in the pre- and post-development conditions. Flows to the catch basin in the driveway are modeled as Pond 3 on the pre- and post-development conditions. Flows to the easterly abutting parking lot are modeled as Subcatchment 9 on the pre- and post-development conditions.


### **Calculation Summary and Comparison of Flows:**

In all of the storms studied, the 2-, 10-, 25- and 100-year storms, the runoff leaving the site in the post-development condition will not exceed the peak runoff in the existing (pre-development) condition.

The following table compares the pre- and post-development flows at the Design Points:

Respectfully submitted,

THOMPSON-LISTON ASSOCIATES, INC.



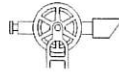
Patrick J. Healy, P.E.  
Project Manager / Civil Engineer

**TABLE A**  
**Runoff Summaries for Storm Events**

<b>Design Point</b>	<b>2-YR</b>	<b>10-YR</b>	<b>25-YR</b>	<b>100-YR</b>
<b>1. Northerly Pond</b>				
Pond 1P pre	8.77 cfs	15.21 cfs	19.65 cfs	26.47 cfs
Pond 1P post	8.77	15.09	19.61	26.47
<b>2. Catch Basin in Driveway</b>				
Reach 9R pre	2.80 cfs	4.65 cfs	5.78 cfs	7.52 cfs
Reach 9R post	2.67	4.50	5.64	7.37
<b>3. Abutting Easterly Lot</b>				
Reach 10R pre	0.65 cfs	1.58 cfs	2.21 cfs	3.23 cfs
Reach 10R post	0.63	1.54	2.16	3.15
<b>4. Westerly Slope</b>				
Reach 7R pre	0.82 cfs	1.57 cfs	2.05 cfs	2.80 cfs
Reach 7R post	0.82	1.57	2.05	2.80



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## **Stormwater Standards Compliance Statement Fairlawn Hospital Addition and Renovation 189 May Street Worcester, Massachusetts**

**September 14, 2021**

A portion of the existing building entrance canopy and paved areas will be removed and replaced with a building addition that will serve as the new main entrance and ambulance entrance to the hospital, as well as new rooms on the upper floors. The renovations and expansion will not result in additional patient beds or uses, but will convert several multi-patient rooms, and new rooms to private or semi-private rooms. Portions of the lot will be redeveloped to construct the addition, relocate accessible parking spaces and walks, and improve emergency vehicle access. As a redevelopment project, the project will comply with the Massachusetts DEP Stormwater Standards only to the extent practicable, as described below. Where a particular Standard does not apply to the project, an explanation is provided. Each statement either describes compliance with those Standards that are applicable to the scope of work proposed.

### STANDARD 1 – NO NEW UNTREATED DISCHARGES

Runoff from the site includes runoff from roofs, paved areas, and landscaped areas. Stormwater runoff from existing paved driveways and roofs currently runs off in four separate directions, which we evaluated and for which we designed mitigating measures to limit the postdevelopment runoff to or below the predevelopment levels. Much of the area of redevelopment flows to two drainage systems, to the existing parking lot drainage system toward an existing detention basin to the north, and to catch basins in the main driveway which connection downslope toward May street through easements on the adjacent property to the east. To the southeast and southwest some areas contribute overland flow to adjacent properties. In the proposed condition, the runoff from impervious driveways will generally slope and runoff in the same directions. The roof runoff of the new building addition and patient drop off canopy will be connected by pipes to the existing parking lot drainage system to the north. The piped drainage system will then be retrofitted to constrict the pipe leading out the existing surface detention basin, in order to avoid divert the discharge through a subsurface detention/infiltration BMP. Although there is a net increase of 7,013 sq. ft. of impervious area, the actual peak rate and volume of runoff will be less in the proposed condition. No new untreated discharges are proposed.

### STANDARD 2 – PEAK RATE ATTENUATION

As described in the report and hydrologic calculations, the peak rate of runoff will be mitigated for the 2, 10, 25, and 100-year storms, so there is no contribution to off-site flooding.

### STANDARD 3 – RECHARGE

Though the redevelopment results in a modest increase to impervious cover, and equivalent area of impervious parking lot will be removed on the west edge of the parking lot, so the project does not result in an increase in impervious cover. Soil types present on the site are identified as Paxton fine sandy loam, which would normally be classified as hydrologic group C soil. However, the soil borings in the area of development indicate dense glacial till with inordinate fine content, between

25%-40% passing the #200 sieve. This type of soil is unsuitable for any type of infiltration systems whether open air or subsurface. As such, we will not be proposing any recharge.

#### STANDARD 4 – WATER QUALITY

Standard 4 is also based up on the amount of new impervious surfaces being created on a site. As stated in the prior section, no increase in the impervious cover is proposed by this project.

In this case, all runoff from the altered impervious parking area and walks will continue to be directed to deep sump catch basins and walks. Once small area of the fire lane will be collected into a trench drain with a sump, and will be piped around the ambulance bay. The roof runoff is considered clean and is not subject to the Standard 4 requirements.

#### STANDARD 5 – LUHPPLs

Site does not fall into this category.

#### STANDARD 6 – CRITICAL AREAS

Site is not in or near a critical area as defined in the DEP Stormwater Handbook.

#### STANDARD 7 – REDEVELOPMENT

As a redevelopment site, the modest increase in impervious cover is mitigated through the reduction of paved surface in another area of the site. The redevelopment of the site will represent an improvement in stormwater management in terms of reduction of the peak rate of flow through additional mitigation. In addition, there will be an O&M plan in place for improved long term water quality and protection of stormwater infrastructure.

#### STANDARD 8 – CONSTRUCTION PERIOD CONTROLS

An Erosion and Sedimentation Control Plan has been developed, and is shown on the plans. Details of the BMPs are shown on the Detail Sheet of the Site Plan.

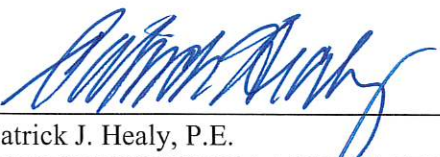
#### STANDARD 9 – OPERATION AND MAINTENANCE PLAN

An Operation and Maintenance Program covering the construction period and post-construction period maintenance and inspection requirements of the proposed stormwater structures has been written and is included herewith.

#### STANDARD 10 – PROHIBITION OF ILLICIT DISCHARGES

Provisions will be made to prevent illicit non-stormwater discharges to waters of the Commonwealth. The owner is cognizant of the effects upon the environment of improper disposal of wastewater, process waste, raw materials, toxic and hazardous substances, oil and grease, and seeks to prevent damage to the environment. Such substances if present shall be stored in covered containers or within parked vehicles on the site and will not be exposed to rainfall. Spill kits will be stored on site and replenished as necessary to prevent the migration of potential contaminants.

Prepared by:

  
Patrick J. Healy, P.E.  
THOMPSON-LISTON ASSOCIATES, INC



# Checklist for Stormwater Report

## A. Introduction

**Important:** When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.<sup>1</sup> This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8<sup>2</sup>
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

<sup>1</sup> The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

<sup>2</sup> For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the Issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.





# Checklist for Stormwater Report

## B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

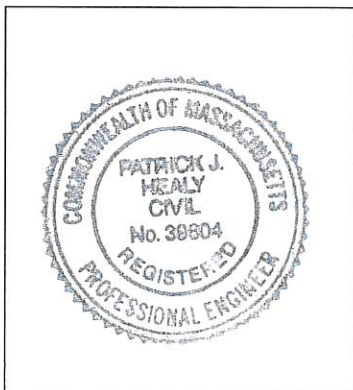
*Note:* Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

### Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



Signature and Date

## Checklist

**Project Type:** Is the application for new development, redevelopment, or a mix of new and redevelopment?

- ☐ New development
- ☒ Redevelopment
- ☐ Mix of New Development and Redevelopment





# Checklist for Stormwater Report

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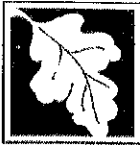
## Checklist (continued)

**LID Measures:** Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- ☒ No disturbance to any Wetland Resource Areas
- ☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- ☒ Reduced Impervious Area (Redevelopment Only)
- ☒ Minimizing disturbance to existing trees and shrubs
- ☐ LID Site Design Credit Requested:
  - ☐ Credit 1
  - ☐ Credit 2
  - ☐ Credit 3
- ☐ Use of "country drainage" versus curb and gutter conveyance and pipe
- ☐ Bioretention Cells (includes Rain Gardens)
- ☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- ☐ Treebox Filter
- ☐ Water Quality Swale
- ☐ Grass Channel
- ☐ Green Roof
- ☐ Other (describe): \_\_\_\_\_

### Standard 1: No New Untreated Discharges

- ☒ No new untreated discharges
- ☐ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- ☒ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.



# Checklist for Stormwater Report

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## Checklist (continued)

### Standard 2: Peak Rate Attenuation

- ☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.
- ☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.
- ☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

### Standard 3: Recharge

- ☒ Soil Analysis provided.
- ☐ Required Recharge Volume calculation provided.
- ☐ Required Recharge volume reduced through use of the LID site Design Credits.
- ☐ Sizing the infiltration, BMPs is based on the following method: Check the method used.
  - ☐ Static
  - ☐ Simple Dynamic
  - ☐ Dynamic Field<sup>1</sup>
- ☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.
- ☐ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.
- ☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.
- ☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:
  - ☒ Site is comprised solely of C and D soils and/or bedrock at the land surface
  - ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
  - ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
  - ☒ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.
- ☐ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.
- ☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

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<sup>1</sup> 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.



# Checklist for Stormwater Report

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## Checklist (continued)

### Standard 3: Recharge (continued)

- ☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.
- ☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

### Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
  - Provisions for storing materials and waste products inside or under cover;
  - Vehicle washing controls;
  - Requirements for routine inspections and maintenance of stormwater BMPs;
  - Spill prevention and response plans;
  - Provisions for maintenance of lawns, gardens, and other landscaped areas;
  - Requirements for storage and use of fertilizers, herbicides, and pesticides;
  - Pet waste management provisions;
  - Provisions for operation and management of septic systems;
  - Provisions for solid waste management;
  - Snow disposal and plowing plans relative to Wetland Resource Areas;
  - Winter Road Salt and/or Sand Use and Storage restrictions;
  - Street sweeping schedules;
  - Provisions for prevention of illicit discharges to the stormwater management system;
  - Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
  - Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
  - List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.
- ☐ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.
  - ☐ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:
    - ☐ is within the Zone II or Interim Wellhead Protection Area
    - ☐ is near or to other critical areas
    - ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
    - ☐ involves runoff from land uses with higher potential pollutant loads.
  - ☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.
  - ☐ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.



# Checklist for Stormwater Report

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## Checklist (continued)

### Standard 4: Water Quality (continued)

- ☐ The BMP is sized (and calculations provided) based on:
  - ☐ The ½" or 1" Water Quality Volume or
  - ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
- ☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the proprietary BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.
- ☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

### Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

- ☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.
- ☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted **prior to** the discharge of stormwater to the post-construction stormwater BMPs.
- ☐ The NPDES Multi-Sector General Permit does **not** cover the land use.
- ☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.
- ☐ All exposure has been eliminated.
- ☐ All exposure has **not** been eliminated and all BMPs selected are on MassDEP LUHPPL list.
- ☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

### Standard 6: Critical Areas

- ☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.
- ☐ Critical areas and BMPs are identified in the Stormwater Report.





# Checklist for Stormwater Report

## Checklist (continued)

### Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

- ☒ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:
  - ☐ Limited Project
  - ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
  - ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
  - ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
  - ☐ Bike Path and/or Foot Path
- ☒ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.
- ☒ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.
- ☒ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

### Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
  - Construction Period Operation and Maintenance Plan;
  - Names of Persons or Entity Responsible for Plan Compliance;
  - Construction Period Pollution Prevention Measures;
  - Erosion and Sedimentation Control Plan Drawings;
  - Detail drawings and specifications for erosion control BMPs, including sizing calculations;
  - Vegetation Planning;
  - Site Development Plan;
  - Construction Sequencing Plan;
  - Sequencing of Erosion and Sedimentation Controls;
  - Operation and Maintenance of Erosion and Sedimentation Controls;
  - Inspection Schedule;
  - Maintenance Schedule;
  - Inspection and Maintenance Log Form.
- ☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.



# Checklist for Stormwater Report

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## Checklist (continued)

### Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

- ☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has **not** been included in the Stormwater Report but will be submitted **before** land disturbance begins.
- ☒ The project is **not** covered by a NPDES Construction General Permit.
- ☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.
- ☐ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

### Standard 9: Operation and Maintenance Plan

- ☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:
  - ☐ Name of the stormwater management system owners;
  - ☐ Party responsible for operation and maintenance;
  - ☐ Schedule for implementation of routine and non-routine maintenance tasks;
  - ☐ Plan showing the location of all stormwater BMPs maintenance access areas;
  - ☐ Description and delineation of public safety features;
  - ☐ Estimated operation and maintenance budget; and
  - ☐ Operation and Maintenance Log Form.
- ☐ The responsible party is **not** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:
  - ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
  - ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

### Standard 10: Prohibition of Illicit Discharges

- ☒ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;
- ☐ An Illicit Discharge Compliance Statement is attached;
- ☐ NO Illicit Discharge Compliance Statement is attached but will be submitted **prior to** the discharge of any stormwater to post-construction BMPs.

Soil Map—Worcester County, Massachusetts, Northeastern Part



Natural Resources  
Conservation Service

Web Soil Survey  
National Cooperative Soil Survey

7/12/2021  
Page 1 of 3

# Soil Map—Worcester County, Massachusetts, Northeastern Part

## MAP LEGEND

<b>Area of Interest (AOI)</b>		Spoil Area
Area of Interest (AOI)		Stony Spot
<b>Soils</b>		Very Stony Spot
Soil Map Unit Polygons		Wet Spot
Soil Map Unit Lines		Other
Soil Map Unit Points		Special Line Features
<b>Special Point Features</b>		<b>Water Features</b>
Blowout		Streams and Canals
Borrow Pit		<b>Transportation</b>
Clay Spot		Rails
Closed Depression		Interstate Highways
Gravel Pit		US Routes
Gravelly Spot		Major Roads
Landfill		Local Roads
Lava Flow		<b>Background</b>
Marsh or swamp		Aerial Photography
Mine or Quarry		
Miscellaneous Water		
Perennial Water		
Rock Outcrop		
Saline Spot		
Sandy Spot		
Severely Eroded Spot		
Sinkhole		
Slide or Slip		
Sodic Spot		

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL:  
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Worcester County, Massachusetts,  
Northeastern Part  
Survey Area Data: Version 15, Jun 10, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

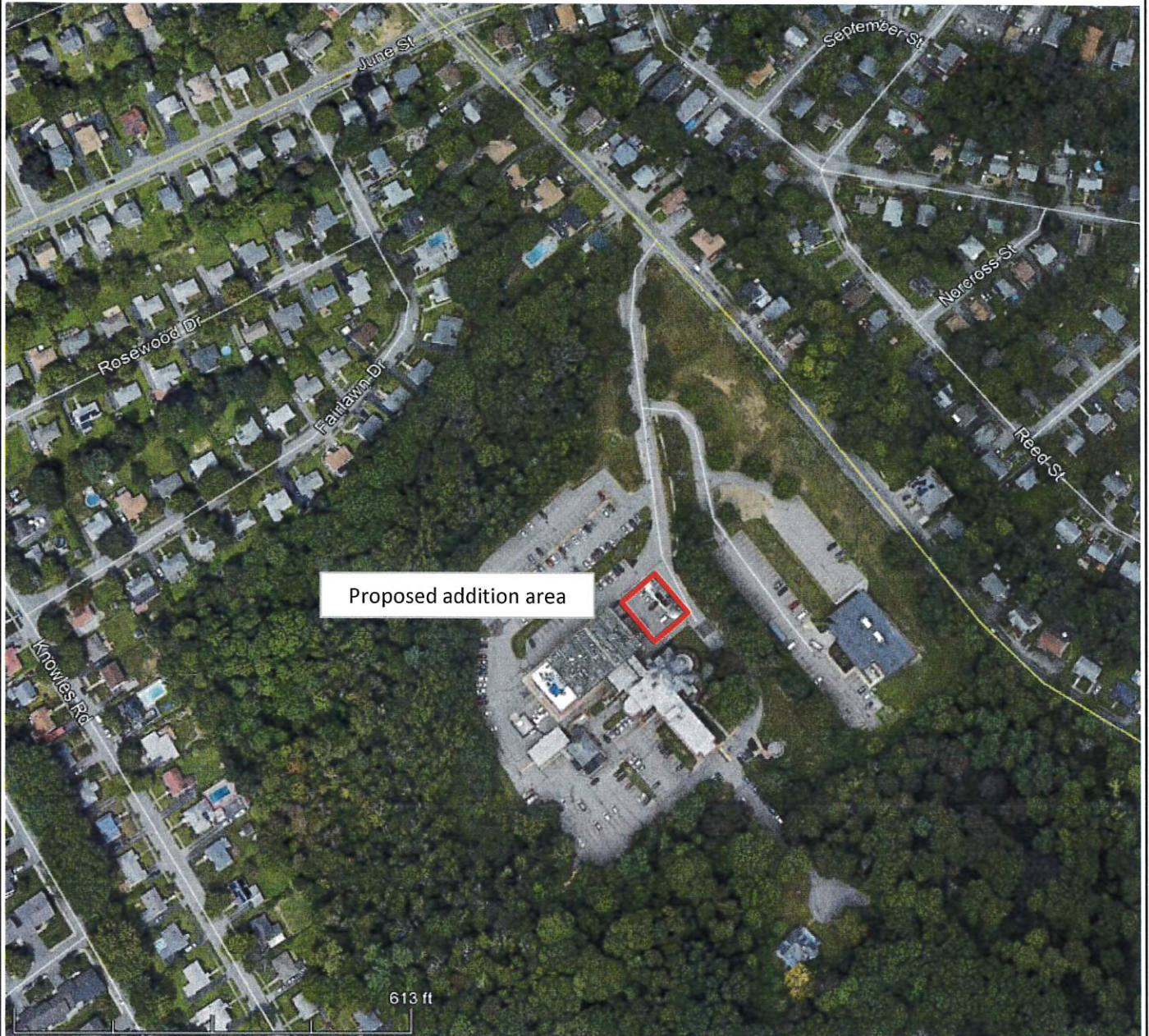
Date(s) aerial images were photographed: Sep 12, 2014—Sep 28, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.



## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
31A	Walpole sandy loam, 0 to 3 percent slopes	4.4	15.1%
305B	Paxton fine sandy loam, 3 to 8 percent slopes	8.4	28.3%
305C	Paxton fine sandy loam, 8 to 15 percent slopes	13.8	46.7%
622C	Paxton-Urban land complex, 8 to 15 percent slopes	1.2	4.2%
625C	Hinckley-Urban land complex, 0 to 15 percent slopes	1.7	5.7%
<b>Totals for Area of Interest</b>		<b>29.5</b>	<b>100.0%</b>



**Yankee Engineering  
& Testing, Inc.**

10 Mason Street  
Worcester, MA 10609

Phone: (508) 831-7404 • Fax: (508) 831-7388

**Project:** Fairlawn Rehabilitation Hospital

**Location:** 189 May Street, Worcester, MA

**Project #:** 19103

**Date:** May 10, 2021

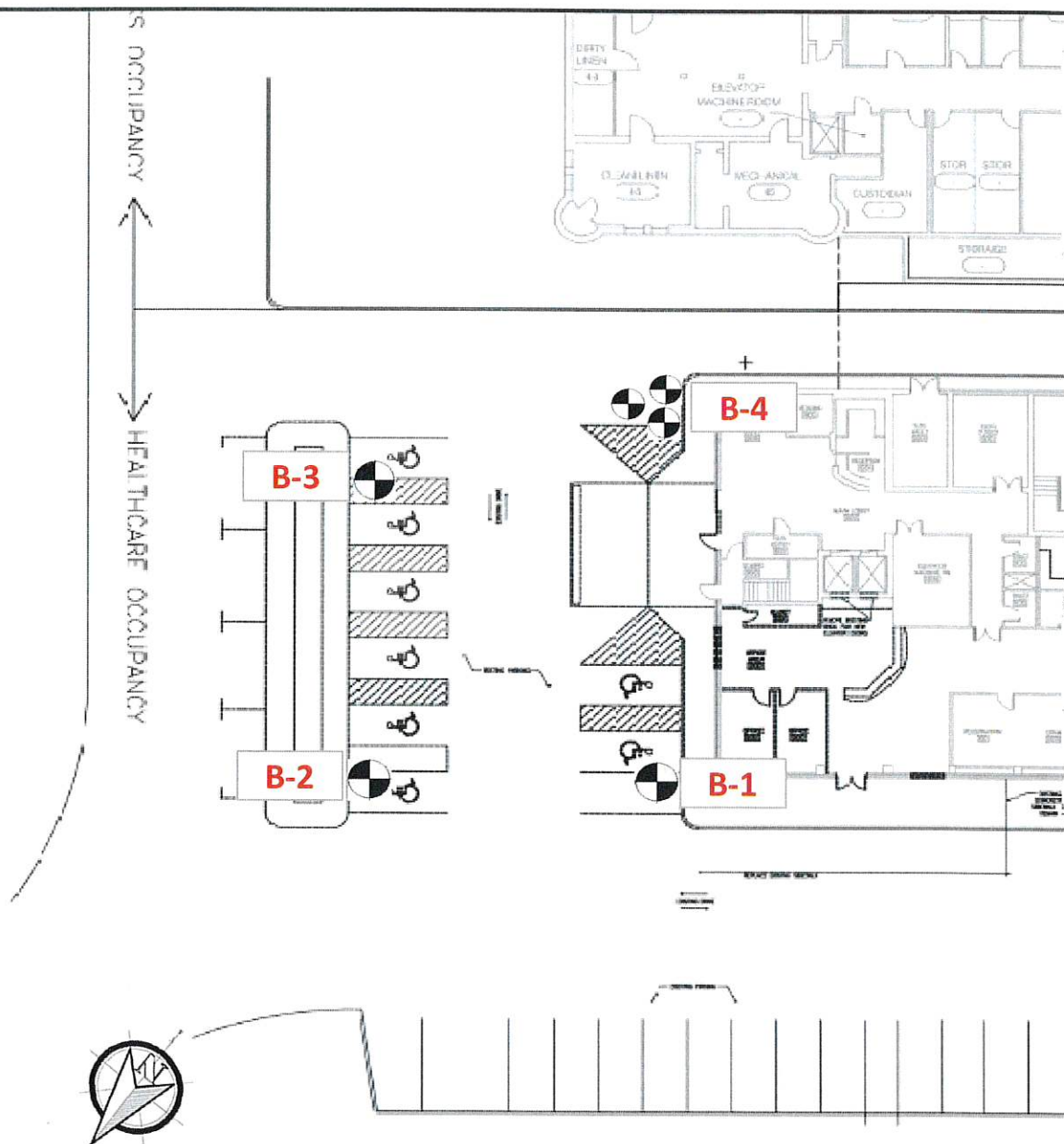
**Client:** Encompass Health

**FROM:** Google Earth  
Aerial photo

**SITE LOCUS PLAN  
FIGURE 1**

**Approx. Scale**  
See Map Scale





GROUND FLOOR EXISTING PLAN

SCALE: 1/8"=1'-0"

# **Yankee Engineering & Testing, Inc.**

10 Mason Street  
Worcester, MA 01609  
Phone: (508) 831-7404  
Fax: (508) 831-7388

## **Project:**

Fiarlawn Rehabilitation Hospital

## **Location:**

189 May Street, Worcester, MA

## **Project #:**

19103

## **Date:**

May 10, 2021

## **Client:**

Encompass Health

FROM: Schematic Site Plan

**BORING LOCATION PLAN**  
**FIGURE 2**

**Approx. Scale:**  
See map scale

# SOIL TEST BORING LOG

Boring #	<b>B - 1</b>
Sheet #	1 of 1
Location:	Addition west
Elevation:	≈ 597'
Drill Date:	5/10/2021

Client: Encompass Health  
 Project: Fairlawn Rehabilitation Hospital  
 Project Address: 189 May Street, Worcester, MA  
 Project No.: 19103

Drilling Type	Type Size Hammer Fall	SPT 2" I.D. 140 lbs 30"	Groundwater Observations		
			Depth (ft)	Casing at	Stabilization Period
			No GW	n/a	Upon boring completion

Depth (ft)	No.	Depth (ft)	Pen. (in)	Rec. (in)	Blows/6"	Strata Change	Sample Descriptions & Geotechnical Observations	Remarks
1	S-1	0 - 2	24	10	6 - 2		Brown/gray, moist, VERY LOOSE, silty SAND little gravel/asphalt	4" Asphalt
2					2 - 5			Fill
3	S-2	2 - 4	24	26	20 - 17	2'	Gray/brown, damp, dense, silty SAND little gravel	
4					21 - 25			Native
5								
6	S-3	5 - 6'3"	15	9	22 - 25		Gray/brown, damp, very dense, silty SAND and GRAVEL	
7					50+/3"			
8						6'	Auger refusal on suspected boulder at 6' in native silty SAND and GRAVEL	≈ 591'
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								

Drilling Co.:	Soll Ex Corp	Cohesive (blows/ft)		Cohesionless (blows/ft)		<ul style="list-style-type: none"> <li>Refer to geotechnical report dated 5/17/21 for additional information</li> <li>Ground elevation based on existing ground surface</li> <li></li> </ul>
Rig Type:	Mobile B57 Truck	0 - 2	Very Soft	0 - 3	Very Loose	
Driller:	Mr. Rich Bonetti	2 - 4	Soft	4 - 9	Loose	
Helper:	Mr. Josh Goodale	5 - 8	Medium Stiff	10 - 29	Medium Dense	
Inspector:	Mr. Joel Morin	9 - 15	Stiff	30 - 49	Dense	
Client Rep.:	Mr. Joeseeph Durkin	16 - 30	Hard	50+/ft	Very Dense	



# SOIL TEST BORING LOG

Boring #	<b>B - 2</b>
Sheet #	1 of 1
Location:	Addition north
Elevation:	≈ 597'
Drill Date:	5/10/2021

Client: Encompass Health  
 Project: Fairlawn Rehabilitation Hospital  
 Project Address: 189 May Street, Worcester, MA  
 Project No.: 19103

Drilling Type	Type	SPT	Groundwater Observations		
			Depth (ft)	Casing at	Stabilization Period
	Hammer Fall	2" I.D. 140 lbs 30"	10'	n/a	Upon boring completion

Depth (ft)	No.	Boring Sampling Data				Strata Change	Sample Descriptions & Geotechnical Observations	Remarks
		Depth (ft)	Pen. (in)	Rec. (in)	Blows/6"			
1	S-1	0 - 2	24	11	4 - 3		3" Gray/black, reclaimed gravel/asphalt	4" Asphalt
2					5 - 9		8" Brown/gray, damp, LOOSE, silty sand some gravel	Fill
3	S-2	2 - 4	24	20	15 - 21	2'	Same as S-1 but dense	Native
4					20 - 22			
5								
6	S-3	5 - 7	24	16	18 - 36		Same as S-1 but very dense	Native
7					49 - 41			
8	S-4	7 - 7'3"	3	3	50+/3"		Same as S-1 but very dense	Native
9								
10								
11	S-5	10 - 12	24	14	15 - 17	10'	Same as S-1 but very dense and moist	Native
12					43 - 20			
13								
14								
15								
16	S-6	15 - 17	24	18	10 - 19		Brown/gray, moist, dense, SILT and SAND trace gravel	Native
17					27 - 33			
18								
19								
20								
21	S-7	20 - 22	24	12	14 - 32		Gray, moist, very dense, silty SAND trace gravel	Native
22					32 - 38			
23								
24						22'	Boring terminated at 22' in native silty SAND trace gravel	≈ 575'
25								

Drilling Co.:	Soli Ex Corp	Cohesive (blows/ft)		Cohesionless (blows/ft)		<ul style="list-style-type: none"> <li>Refer to geotechnical report dated 5/17/21 for additional information</li> <li>Ground elevation based on existing ground surface</li> </ul>
Rig Type:	Mobile B57 Truck	0 - 2	Very Soft	0 - 3	Very Loose	
Driller:	Mr. Rich Bonetti	2 - 4	Soft	4 - 9	Loose	
Helper:	Mr. Josh Goodale	5 - 8	Medium Stiff	10 - 29	Medium Dense	
Inspector:	Mr. Joel Morin	9 - 15	Stiff	30 - 49	Dense	
Client Rep.:	Mr. Joeseeph Durkin	16 - 30	Hard	50+/ft	Very Dense	

# SOIL TEST BORING LOG

Boring #	<b>B - 3</b>
Sheet #	1 of 1
Location:	Addition east
Elevation:	≈ 598'
Drill Date:	5/10/2021

Client: Encompass Health  
 Project: Fairlawn Rehabilitation Hospital  
 Project Address: 189 May Street, Worcester, MA  
 Project No.: 19103

Drilling Type	Type Size Hammer Fall	SPT 2" I.D. 140 lbs 30"	Groundwater Observations		
			Depth (ft)	Casing at	Stabilization Period
			10'	n/a	Upon boring completion

Depth (ft)	No.	Boring Sampling Data			Strata Change	Sample Descriptions & Geotechnical Observations	Remarks
Depth (ft)	No.	Depth (ft)	Pen. (in)	Rec. (in)	Blows/6"		
1	S-1	0 - 2	24	12	5 - 14	4" Gray, damp, sand and gravel/asphalt	4" Asphalt
2					17 - 15	8" Brown, moist, dense, silty SAND and gravel	Fill
3	S-2	2 - 4	24	14	18 - 22	2' Brown, damp, very dense, silty SAND and gravel	Native
4					28 - 21		
5							
6	S-3	5 - 7	24	16	44 - 40	Same as S-2	Native
7					40 - 32		
8	S-4	7 - 8	12	12	43 - 50+/6"	Brown, damp, very dense, silty SAND some gravel	Native
9							
10							
11	S-5	10 - 12	24	14	13 - 14	10' Same as S-2 but medium dense and moist	Native
12					11 - 15		
13							
14							
15							
16	S-6	15 - 17	24	18	15 - 22	Same as S-2 but dense	Native
17					27 - 24		
18							
19							
20							
21							
22	S-7	20 - 22	13	16	23 - 88	Brown, damp, very dense, silty SAND little gravel	Native
23					50+/1"		
24							
25						22' Boring terminated at 22' in native silty SAND little gravel	≈ 576'

Drilling Co.:	Soil Ex Corp	Cohesive (blows/ft)		Cohesionless (blows/ft)		<ul style="list-style-type: none"> <li>Refer to geotechnical report dated 5/17/21 for additional information</li> <li>Ground elevation based on existing ground surface</li> </ul>
Rig Type:	Mobile B57 Truck	0 - 2	Very Soft	0 - 3	Very Loose	
Driller:	Mr. Rich Bonetti	2 - 4	Soft	4 - 9	Loose	
Helper:	Mr. Josh Goodale	5 - 8	Medium Stiff	10 - 29	Medium Dense	
Inspector:	Mr. Joel Morin	9 - 15	Stiff	30 - 49	Dense	
Client Rep.:	Mr. Joseph Durkin	16 - 30	Hard	50+/ft	Very Dense	

# SOIL TEST BORING LOG

Boring #	<b>B - 4</b>
Sheet #	1 of 1
Location:	Addition south
Elevation:	≈ 597'
Drill Date:	5/10/2021

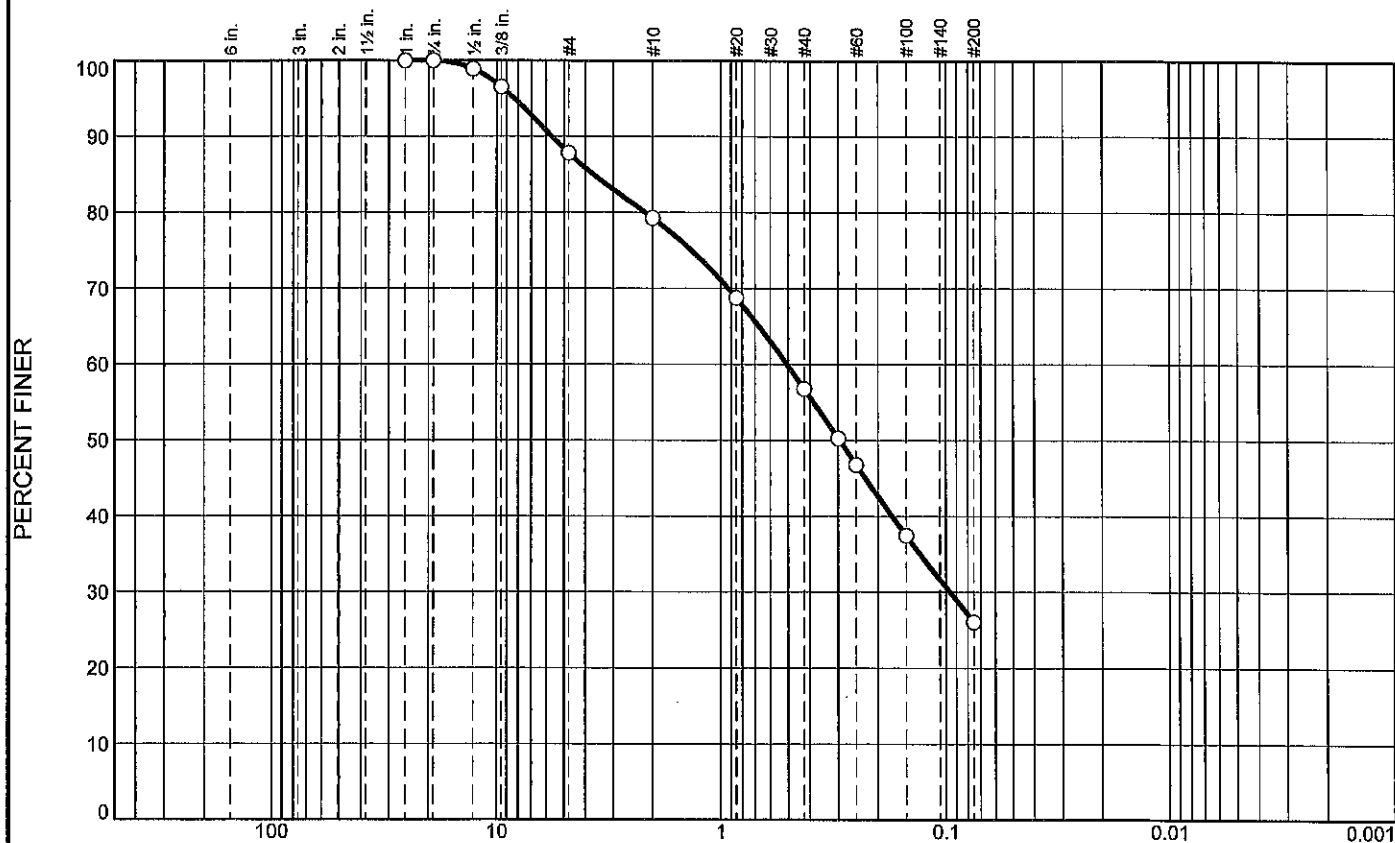
Client: Encompass Health  
 Project: Fairlawn Rehabilitation Hospital  
 Project Address: 189 May Street, Worcester, MA  
 Project No.: 19103

Drilling Type	Type Size Hammer Fall	SPT 2" I.D. 140 lbs 30"	Groundwater Observations		
			Depth (ft)	Casing at	Stabilization Period
			No GW	n/a	Upon boring completion

Depth (ft)	No.	Boring Sampling Data				Strata Change	Sample Descriptions & Geotechnical Observations	Remarks
Depth (ft)	No.	Depth (ft)	Pen. (in)	Rec. (in)	Blows/ft			
1	S-1	0 - 2	24	6	4 - 3		2" Gray, damp, sand and gravel	4" Asphalt
2					5 - 8		4" Brown, damp, LOOSE, silty sand and gravel	Fill
3	S-2	2 - 4	24	10	5 - 10	2'	Brown/gray, damp, medium dense, silty SAND little gravel	Native
4					17 - 12			
5							Refusal x 2; move 3' away from existing building	Native
6	S-3	5 - 6'3"	15	8	19 - 30		Same as S-2 but very dense	
7					50 +/- 3"			
8						6'3"	Boring terminated with auger refusal on suspected boulder at 6'3" after attempting 3 holes in native silty sand and gravel	≈ 591'
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								

Drilling Co.:	Soil Ex Corp	Cohesive (blows/ft)		Cohesionless (blows/ft)		<ul style="list-style-type: none"> <li>Refer to geotechnical report dated 5/17/21 for additional information</li> <li>Ground elevation based on existing ground surface</li> </ul>
Rig Type:	Mobile B57 Truck	0 - 2	Very Soft	0 - 3	Very Loose	
Driller:	Mr. Rich Bonetti	2 - 4	Soft	4 - 9	Loose	
Helper:	Mr. Josh Goodale	5 - 8	Medium Stiff	10 - 29	Medium Dense	
Inspector:	Mr. Joel Morin	9 - 15	Stiff	30 - 49	Dense	
Client Rep.:	Mr. Joeseeph Durkin	16 - 30	Hard	50+/ft	Very Dense	

# Particle Size Distribution Report



GRAIN SIZE - mm.

% +3"

0.0

% Gravel

12.2

% Sand

61.7

% Silt

26.1

% Clay

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	100.0		
1/2"	98.9		
3/8"	96.5		
#4	87.8		
#10	79.3		
#20	68.8		
#40	56.8		
#50	50.3		
#60	46.8		
#100	37.5		
#200	26.1		

\* (no specification provided)

## Material Description

Brown SAND some silt little gravel

## Atterberg Limits

PL= NP

LL= NV

PI= NP

## Coefficients

D<sub>85</sub>= 3.6700

D<sub>60</sub>= 0.5060

D<sub>50</sub>= 0.2957

D<sub>30</sub>= 0.0959

D<sub>15</sub>=

D<sub>10</sub>=

C<sub>u</sub>=

C<sub>c</sub>=

## Classification

USCS= SM

AASHTO= A-2-4(0)

## Remarks

Boring jar sampled by Joel Morin 5/10/21

See geotechnical report for additional information

Sample No.: S2

Location: B1

Source of Sample: Geotechnical Borings 5/10/21

Date: 5/12/21

Elev./Depth: 2'-4'

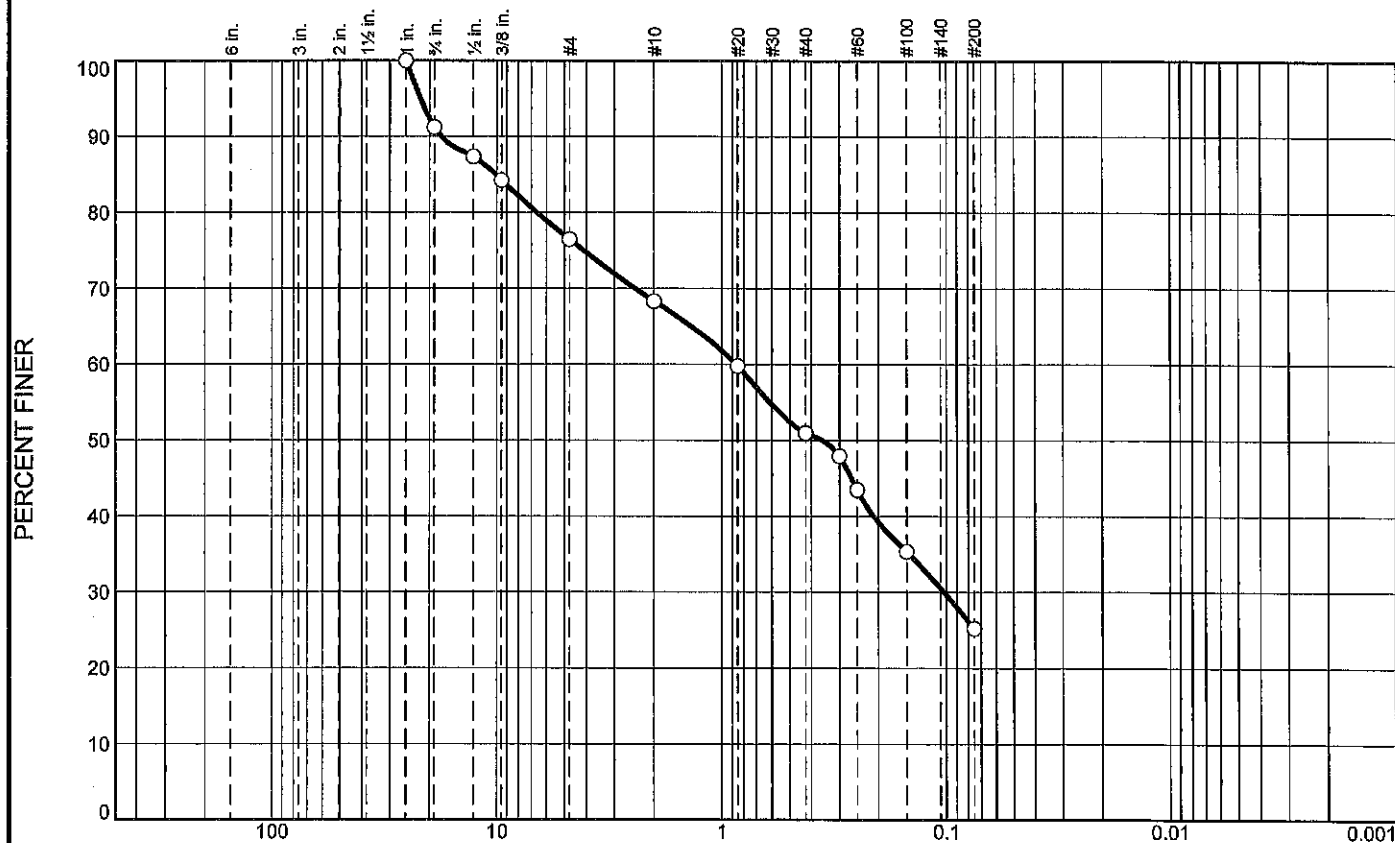
**YANKEE ENGINEERING  
& TESTING, INC.**

Client: Encompass Health  
Project: Fairlawn Rehabilitation Hospital  
189 May Street, Worcester, MA  
Project No: 19103

Tested By: AK

Checked By: SMM

# Particle Size Distribution Report



GRAIN SIZE - mm.

% +3"

0.0

% Gravel

23.5

% Sand

51.3

% Silt

25.2

% Clay

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	91.2		
1/2"	87.4		
3/8"	84.2		
#4	76.5		
#10	68.3		
#20	59.8		
#40	51.0		
#50	47.9		
#60	43.5		
#100	35.4		
#200	25.2		

\* (no specification provided)

## Material Description

Light brown SAND some silt some gravel

## Atterberg Limits

PL= NP

LL= NV

PI= NP

## Coefficients

D<sub>85</sub>= 10.1300

D<sub>60</sub>= 0.8626

D<sub>50</sub>= 0.3561

D<sub>30</sub>= 0.1024

D<sub>15</sub>=

D<sub>10</sub>=

C<sub>u</sub>=

C<sub>c</sub>=

## Classification

USCS= SM

AASHTO= A-2-4(0)

## Remarks

Boring jar sampled by Joel Morin 5/10/21

See geotechnical report for additional information

Sample No.: S3

Location: B2

Source of Sample: Geotechnical Borings 5/10/21

Date: 5/12/21

Elev./Depth: 5'-7'

**YANKEE ENGINEERING  
& TESTING, INC.**

Client: Encompass Health

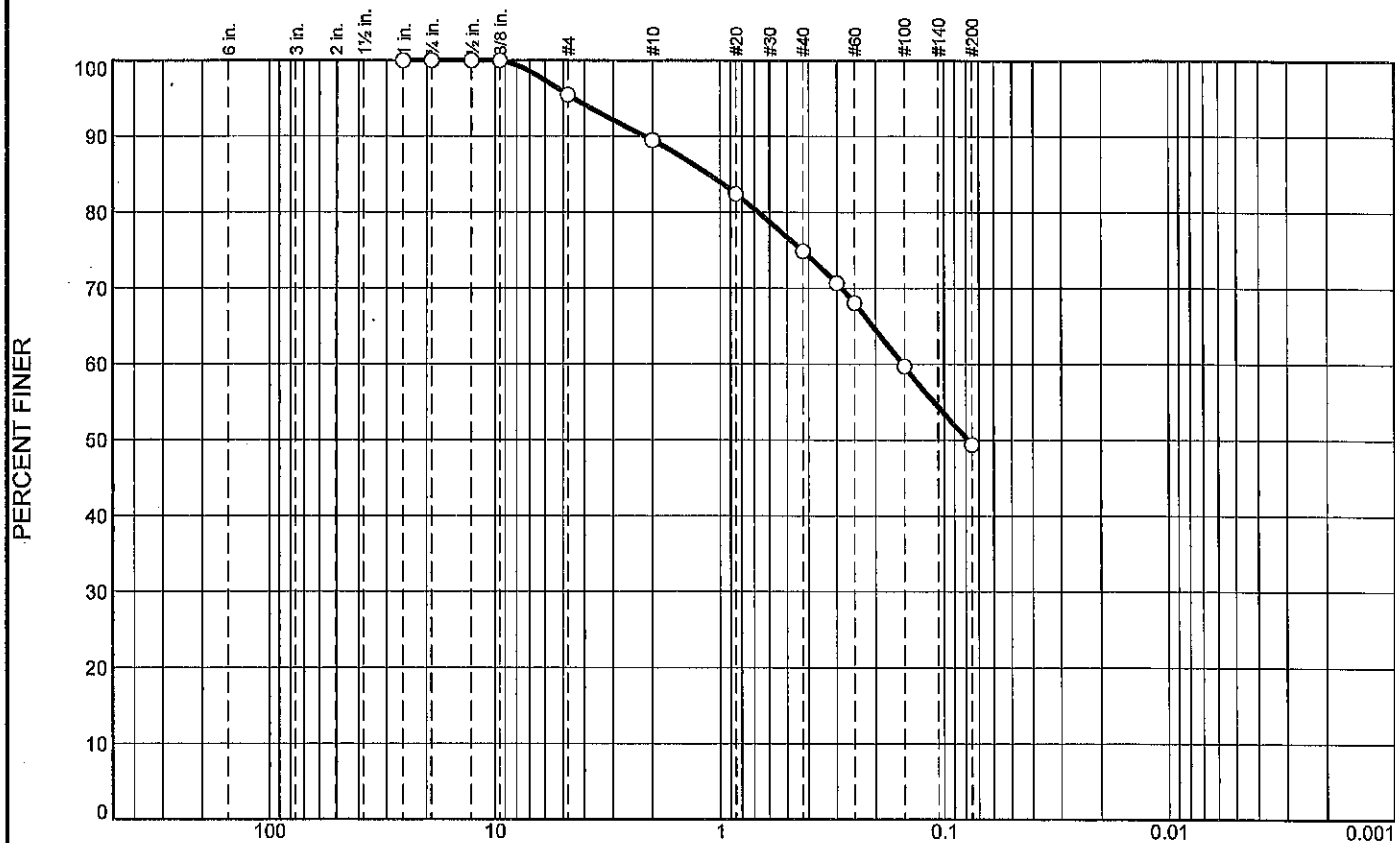
Project: Fairlawn Rehabilitation Hospital  
189 May Street, Worcester, MA

Project No: 19103

Tested By: AK

Checked By: SMM

# Particle Size Distribution Report



GRAIN SIZE - mm.

% +3"

0.0

% Gravel

4.5

% Sand

46.1

% Silt

49.4

% Clay

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
#4	95.5		
#10	89.5		
#20	82.4		
#40	74.9		
#50	70.7		
#60	68.1		
#100	59.7		
#200	49.4		

\* (no specification provided)

## Material Description

Brown/gray SILT and SAND trace gravel

## Atterberg Limits

PL= NP

LL= NV

PI= NP

## Coefficients

D<sub>85</sub>= 1.1254

D<sub>60</sub>= 0.1527

D<sub>50</sub>= 0.0782

D<sub>30</sub>=

D<sub>15</sub>=

D<sub>10</sub>=

C<sub>u</sub>=

C<sub>c</sub>=

## Classification

USCS= SM

AASHTO= A-4(0)

## Remarks

Boring jar sampled by Joel Morin 5/10/21

See geotechnical report for additional information

Sample No.: S6

Location: B2

Source of Sample: Geotechnical Borings 5/10/21

Date: 5/12/21

Elev./Depth: 15'-17'

**YANKEE ENGINEERING  
& TESTING, INC.**

Client: Encompass Health

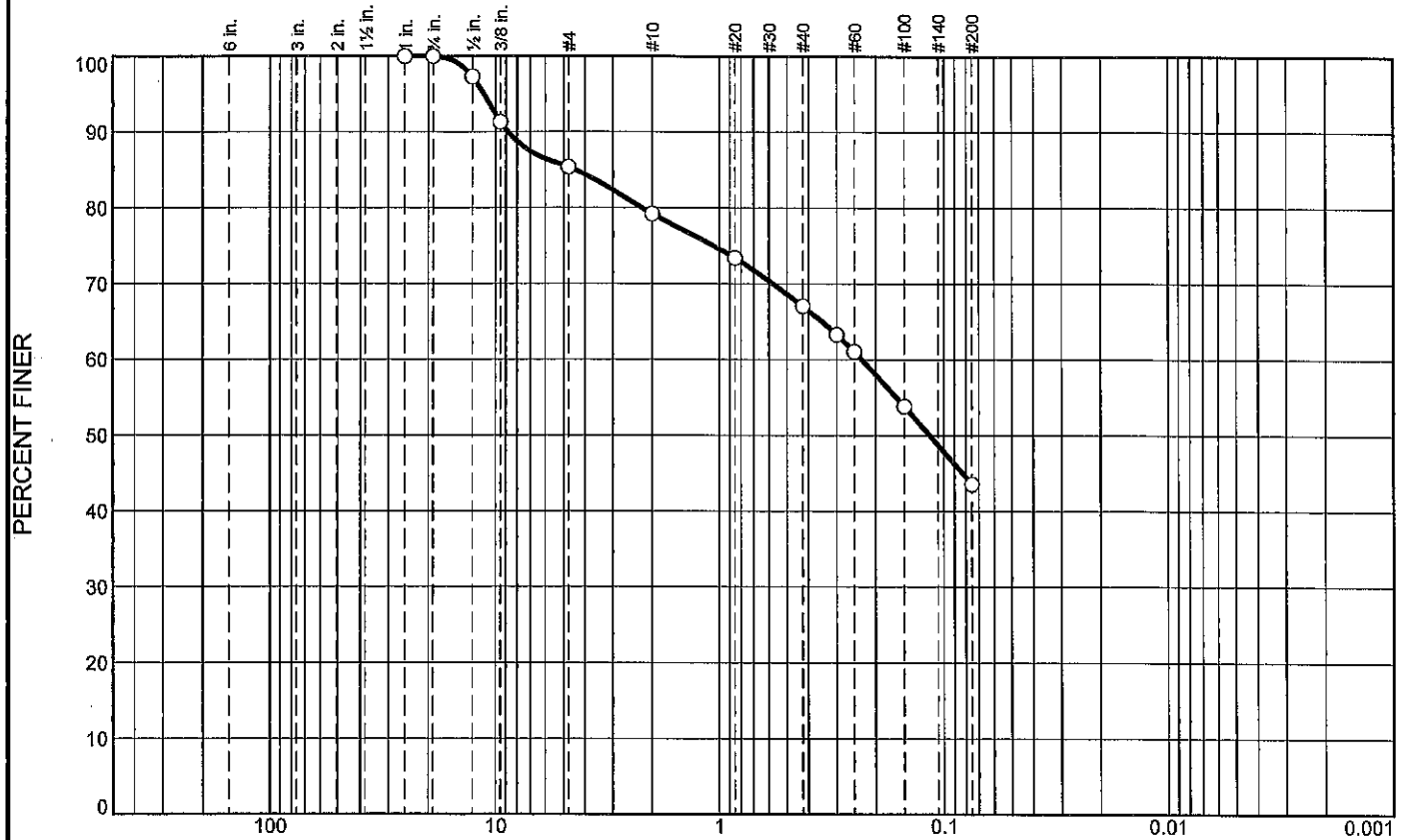
Project: Fairlawn Rehabilitation Hospital  
189 May Street, Worcester, MA

Project No: 19103

Tested By: AK

Checked By: SMM

# Particle Size Distribution Report



GRAIN SIZE - mm.

% +3"

0.0

% Gravel

14.6

% Sand

41.8

% Silt

43.6

% Clay

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	100.0		
1/2"	97.3		
3/8"	91.3		
#4	85.4		
#10	79.2		
#20	73.4		
#40	67.0		
#50	63.3		
#60	61.0		
#100	53.8		
#200	43.6		

\* (no specification provided)

## Material Description

Brown/red SAND and SILT little gravel

## Atterberg Limits

PL= NP

LL= NV

PI= NP

## Coefficients

D<sub>85</sub>= 4.4144

D<sub>60</sub>= 0.2313

D<sub>50</sub>= 0.1156

D<sub>30</sub>=

D<sub>15</sub>=

D<sub>10</sub>=

C<sub>u</sub>=

C<sub>c</sub>=

## Classification

USCS= SM

AASHTO= A-4(0)

## Remarks

Boring jar sampled by Joel Morin 5/10/21

See geotechnical report for additional information

Sample No.: S7

Location: B3

Source of Sample: Geotechnical Borings 5/10/21

Date: 5/12/21

Elev./Depth: 20'-22'

**YANKEE ENGINEERING  
& TESTING, INC.**

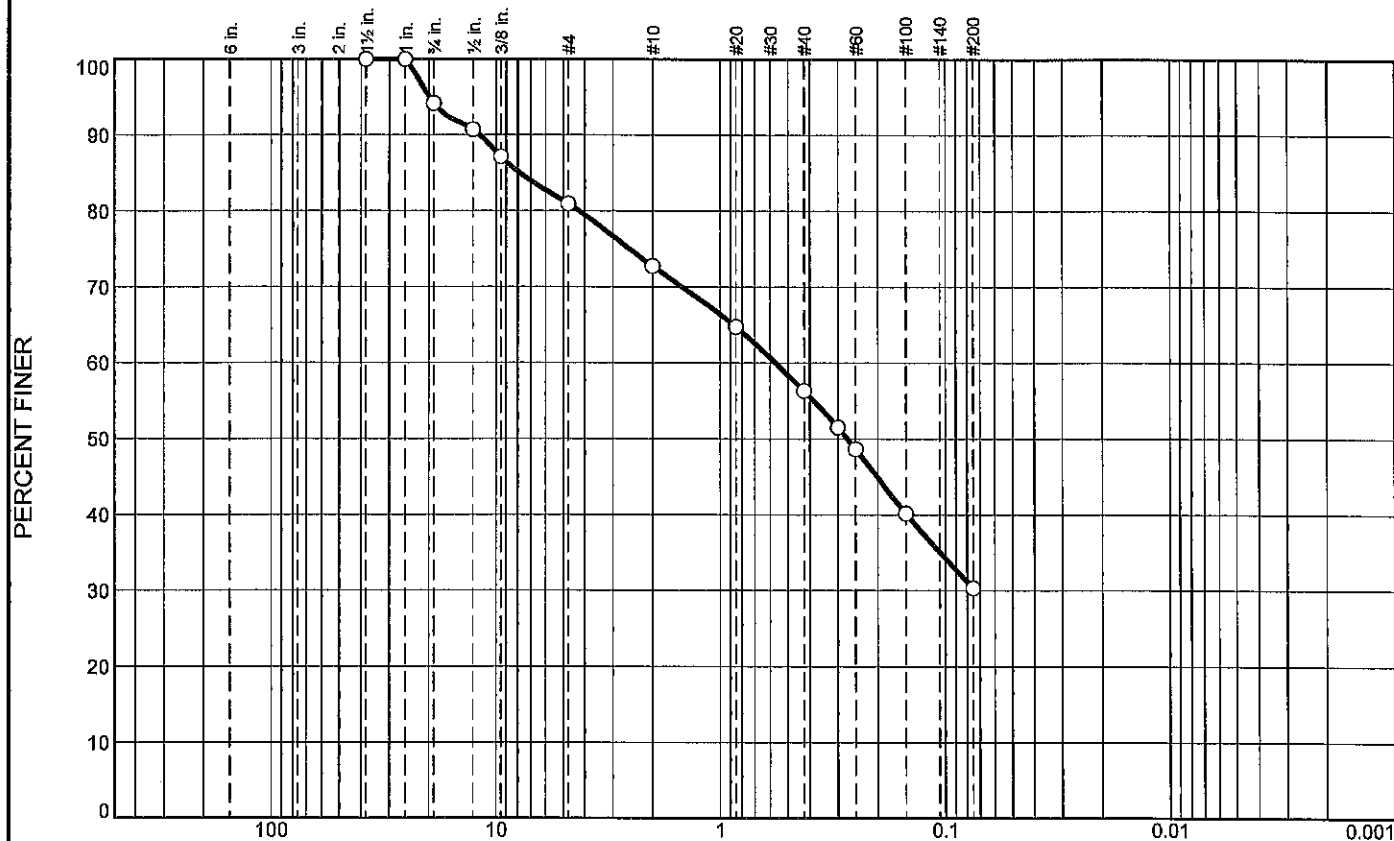
Client: Encompass Health  
Project: Fairlawn Rehabilitation Hospital  
189 May Street, Worcester, MA  
Project No: 19103

Tested By: AK

Checked By: SMM



# Particle Size Distribution Report



GRAIN SIZE - mm.

% +3"

0.0

% Gravel

19.0

% Sand

50.7

% Silt

30.3

% Clay

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1-1/2"	100.0		
1"	100.0		
3/4"	94.2		
1/2"	90.7		
3/8"	87.2		
#4	81.0		
#10	72.7		
#20	64.7		
#40	56.3		
#50	51.5		
#60	48.6		
#100	40.2		
#200	30.3		

\* (no specification provided)

## Material Description

Brown SAND some silt little gravel

PL= NP

## Atterberg Limits

LL= NV

PI= NP

## Coefficients

D<sub>85</sub>= 7.8419

D<sub>60</sub>= 0.5667

D<sub>50</sub>= 0.2721

D<sub>30</sub>=

D<sub>15</sub>=

D<sub>10</sub>=

C<sub>u</sub>=

C<sub>c</sub>=

## Classification

USCS= SM

AASHTO= A-2-4(0)

## Remarks

Boring jar sampled by Joel Morin 5/10/21

See geotechnical report for additional information

Sample No.: S2  
Location: B4

Source of Sample: Geotechnical Borings 5/10/21

Date: 5/12/21  
Elev./Depth: 2'-4'

**YANKEE ENGINEERING  
& TESTING, INC.**

Client: Encompass Health  
Project: Fairlawn Rehabilitation Hospital  
189 May Street, Worcester, MA  
Project No: 19103

Tested By: AK

Checked By: SMM

**CONSTRUCTION PERIOD (SHORT TERM)**  
**STORMWATER OPERATION & MAINTENANCE PROGRAM**  
September 14, 2021

**Fairlawn Rehabilitation Hospital Addition and Renovations**  
**189 May Street**  
**Worcester, Massachusetts**

Currently Owned by:  
New England Rehabilitation Hospital of Central Massachusetts, Inc.

During construction, the contractor is responsible for the following inspection and maintenance. Inspections and resulting maintenance tasks shall be recorded in an Inspection Log that is kept on site and available for inspection by municipal officials.

**Contact Information:**

Name: To be determined  
Address: \_\_\_\_\_  
Contact: \_\_\_\_\_  
Phone: \_\_\_\_\_

1. Sediment control barriers shall be inspected on a weekly basis. The inspector shall inspect for barriers overturned, barriers which have lost contact with the ground allowing runoff to pass underneath them and biodegradation of straw wattles.
2. If collected silt against the sediment control barriers has reached to half the height of the silt fence then it shall be removed. If a sediment control barrier must be replaced, the inspector shall inform the City, contractor, and owner immediately to have this replacement made as soon as possible.
3. The site entrance mat shall be inspected on a weekly basis and refreshed as necessary.
4. The drainage inlets and outlets shall be inspected on a weekly basis and immediately after storm events of ½ inch or more to confirm that they are functioning properly. If any defects are observed or if the inspector shall inform the Engineer, contractor, and owner immediately.
5. The proposed lawn and landscape areas created will be inspected for the presence of rills or other areas of erosion. If areas to be vegetated become bare through either erosion or the failure of vegetation to take, the inspector shall inform the contractor and owner and additional hydroseeding or planting shall be performed, as necessary, to achieve full stabilization through vegetation.
6. If fertilizer is used it must be low in phosphorus and utilize slow-release phosphorus.
7. Pet wastes, food waste, and construction debris must be collected and disposed of, not allowed to biodegrade or enter stormwater runoff.

**POST CONSTRUCTION (LONG TERM)  
STORMWATER OPERATION & MAINTENANCE PROGRAM**

September 14, 2021

**Fairlawn Rehabilitation Hospital  
189 May Street  
Worcester, Massachusetts**

**Post-Construction Owner and Applicant**

**Owner Information:**

Name:	Fairlawn Hospital
Address:	189 May Street, Worcester, MA
Contact:	Josiah Moyer, Facilities Director
Phone:	508-791-6351

Upon completion of the project, the yard and landscaping will continue to be maintained by the future lot owner. Once the construction site has been fully stabilized, the owner should establish a schedule and keep a log of inspection and maintenance activities for the measures described below:

**Landscape Maintenance:**

Vegetated areas in the landscape will reduce erosion, encourage infiltration of rainwater, and keep stormwater clean. It is important to maintain the vegetated areas of the site.

1. Proper mowing is one of the most important ways to maintain a healthy lawn. Mow only when the grass is dry to get a clean cut and minimize the spread of disease. Mow grass to a height of 3". Mow frequently, cutting no more than 1/3 of the height of the grass at a time. Sharpen your mower blades after every 10 hours of mowing.

2. Grass clippings contain high amounts of nitrogen, a key ingredient in fertilizer. Make all attempts to use your grass clippings by leaving them on your lawn. If the grass clippings are not used, do not dispose of them near any wetlands and or water bodies and designate a place to compost them in an upland area.

3. If your lawn areas and plant material demand fertilizer, then use low phosphorus organic or slow-release fertilizers. Fertilize in the fall, but in coordination with weather patterns.

4. The best defense against pests within the grass is to use an Integrated Pest Management system which consists of beneficial insects (lady bugs, spiders, certain nematodes, and bacteria.)

5. Minimize watering the lawn areas. If needed water in the early morning and water deeply and infrequently.

6. Collect and dispose of pet wastes rather than allowing them to be washed off with stormwater runoff.

**Impervious Surface Maintenance:**

Particles that collect on paved surfaces can contain materials that can inhibit water quality. Sweeping sand and debris from the parking lot is a good housekeeping measure that will remove gross pollutants and should be undertaken a minimum of twice per year. DEP recommends frequent sweeping of parking lots in high traffic areas as an integral part of stormwater management.

1. The parking lots shall be swept at least twice a year. Some property owners sweep their sites more frequently to maintain a neat appearance for customers.

2. Accumulated leaves and grass clippings shall also be removed from the impervious surfaces at a minimum of twice per year.
3. In the winter months,  $\text{CaCl}_2$  (calcium chloride salt) application shall be limited to the amount necessary to prevent sand from freezing. Sand shall be used sparingly but in sufficient quantity to maintain the parking and loading surface in a safe condition.

### Catch Basin and Drainage System Maintenance:

The deep sump catch basins remove floatable trash, petroleum products, and sediments from the stormwater in order to prevent them from reaching the waters of the Commonwealth. They must be inspected and cleaned periodically to be sure they are operating properly.

1. Catch basins shall be inspected at a minimum of two times a year (i.e. spring and fall).
2. The visual inspection should ascertain that the traps and deflectors are in place and that there are no blockages or obstructions to the inlet and or trap.
3. If during the inspection, it is noticed that any of the internal components are damaged or missing, they should be repaired immediately.
4. The inspection should also identify evidence of vector infestation (mosquito larvae, for example) and accumulation of hydrocarbons, trash, and sediment in the system.
5. A clamshell truck may be used to clean out catch basins after confirming that there is no oil or fuel floatables present. Disposal of the material from the stormwater BMP sumps shall be in accordance with the local municipality's requirements.
6. Clean the catch basin and hydrodynamic separator during dry weather conditions when no flow is entering the system. Remove debris, sand, and accumulated trash from the unit's interior and remove the fines from the screen.
7. Subsurface structures are confined spaces and only properly trained personnel possessing the proper training and possessing the necessary safety equipment should enter the unit. Confined spaces can contain odorless, colorless poison gas. **Take confined entry precautions seriously.**

### Detention Basin and Open Drainage Swale Maintenance:

Drainage swales and detention basins convey and hold surface stormwater, and their capacity must be maintained regularly to assure proper function to prevent excess runoff and damage to downstream properties.

1. Swales and detention basins should be inspected at a minimum of two times a year (i.e. spring and fall).
2. The visual inspection should ascertain that the slopes are stable, that no erosion and sedimentation is occurring, and the slopes, dikes, and spillways are structurally intact, are that there are no blockages or obstructions to the flow of stormwater.
3. Swales and detention basins shall be mowed at least once per year, and any trees or invasive vegetation should be removed from them on a regular basis. Tree roots can cause structural instability in dikes that are designed to hold water.



## Stormwater Construction Site Inspection Report

General Information			
Project Name	Fairlawn Hospital Addition and Renovation		
NPDES Tracking No.	Not Applicable	Location	189 May Street, Worcester, MA
Date of Inspection		Start/End Time	
Inspector's Name(s)			
Inspector's Title(s)			
Inspector's Contact Information			
Inspector's Qualifications			
Describe present phase of construction			
<b>Type of Inspection:</b> <input type="checkbox"/> Regular <input type="checkbox"/> Pre-storm event <input type="checkbox"/> During storm event <input type="checkbox"/> Post-storm event			
Weather Information			
Has there been a storm event since the last inspection? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, provide: Storm Start Date & Time:                  Storm Duration (hrs):                  Approximate Amount of Precipitation (in):			
<b>Weather at time of this inspection?</b> <input type="checkbox"/> Clear <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain <input type="checkbox"/> Sleet <input type="checkbox"/> Fog <input type="checkbox"/> Snowing <input type="checkbox"/> High Winds <input type="checkbox"/> Other:                                  Temperature:			
Have any discharges occurred since the last inspection? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, describe:			
Are there any discharges at the time of inspection? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, describe:			

### Site-specific BMPs

- Number the structural and non-structural BMPs identified in your SWPPP on your site map and list them below (add as many BMPs as necessary). Carry a copy of the numbered site map with you during your inspections. This list will ensure that you are inspecting all required BMPs at your site.
- Describe corrective actions initiated, date completed, and note the person that completed the work in the Corrective Action Log.

#	BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
1	Erosion control barriers	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2	Temp. settling basin, if any	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3	Catch Basin Inlets, if any	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4	Site Entrance Mat, if any	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5	Floc Blocks & Jute Mesh, if used	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
6	Stockpile Protection, if any	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
7	Site Catch Basins and Manholes, if any	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
8	Downstream Discharge	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

	BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
	Point			
9	Slope Stabilization Measures	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
10		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
11		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
12		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
13		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
14		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
15		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
16		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
17		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
18		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
19		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
20		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

### Overall Site Issues

Below are some general site issues that should be assessed during inspections. Customize this list as needed for conditions at your site.

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
1	Are all slopes and disturbed areas not actively being worked properly stabilized?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2	Are natural resource areas (e.g., streams, wetlands, mature trees, etc.) protected with barriers or similar BMPs?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3	Are perimeter controls and sediment barriers adequately installed (keyed into substrate) and maintained?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4	Are discharge points and receiving waters free of any sediment deposits?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5	Are storm drain inlets properly protected?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
6	Is the construction exit preventing sediment from being tracked into the driveway/ street?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
7	Is trash/litter from work areas collected and placed in covered dumpsters?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
8	Are washout facilities (e.g., paint, stucco, concrete) available, clearly marked, and maintained? To prevent the discharge to the ground and watershed?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
9	Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
10	Are materials that are potential stormwater contaminants stored inside or under cover?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
11	Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
12	(Other)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

#### Non-Compliance

Describe any incidents of non-compliance not described above:

#### CERTIFICATION STATEMENT

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Print name and title: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## ANNUAL RECORD OF MAINTENANCE

**OWNER:** Fairlawn Rehabilitation Hospital

**ADDRESS:** 189 May Street, Worcester, MA

**INSPECTOR:** \_\_\_\_\_ **PHONE:** \_\_\_\_\_

**DEVICES/ AREAS OPERATION AND MAINTENANCE:**

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
<b>LANDSCAPING</b> MAINTENANCE PERFORMED												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
<b>IMPERVIOUS SURFACE</b> MAINTENANCE PERFORMED												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
<b>CATCH BASINS</b> MAINTENANCE PERFORMED												

**ADDITIONAL NOTES:** \_\_\_\_\_

**SIGNATURE:** \_\_\_\_\_ **DATE:** \_\_\_\_\_



## ANNUAL RECORD OF INSPECTIONS

OWNER: Fairlawn Rehabilitation Hospital

ADDRESS: 189 May Street Street, Worcester MA

INSPECTOR: \_\_\_\_\_ PHONE: \_\_\_\_\_

**DEVICES/ AREAS INSPECTED:**

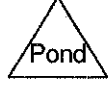
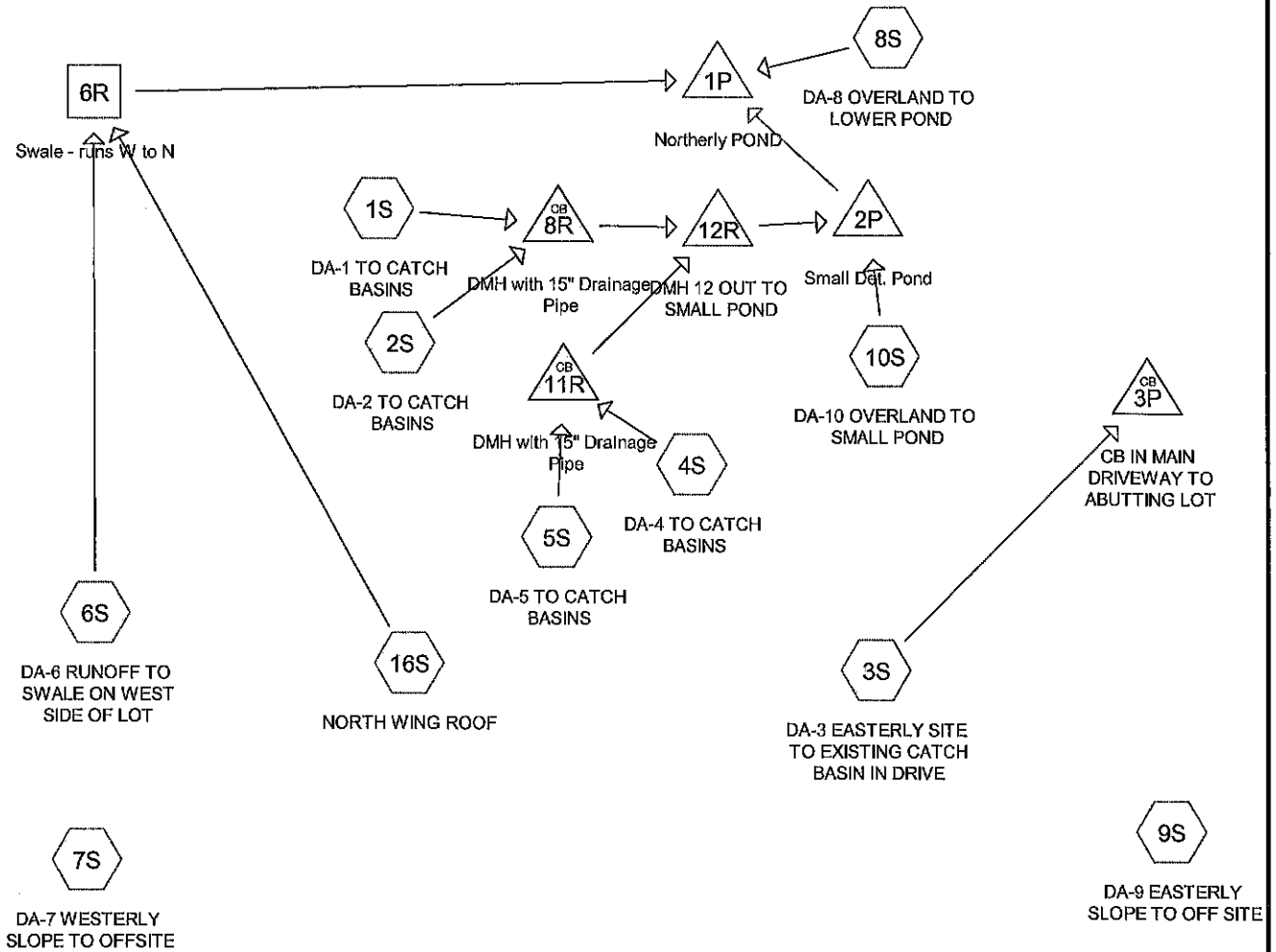
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
<b>LANDSCAPING</b>												
<b>OBSERVATIONS</b>												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
<b>IMPERVIOUS SURFACE</b>												
<b>OBSERVATIONS</b>												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
<b>CATCH BASINS</b>												
<b>OBSERVATIONS</b>												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
<b>DRAINAGE SWALE</b>												
<b>OBSERVATIONS</b>												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
<b>DETENTION BASIN</b>												
<b>OBSERVATIONS</b>												

ADDITIONAL NOTES: \_\_\_\_\_

\_\_\_\_\_

SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

# PREDEVELOPMENT



**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 2-yr Rainfall=3.14"

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**Summary for Subcatchment 1S: DA-1 TO CATCH BASINS**

Runoff = 0.42 cfs @ 12.13 hrs, Volume= 0.033 af, Depth&gt; 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

Area (sf)	CN	Description
* 7,195	98	impervious
7,195		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 2S: DA-2 TO CATCH BASINS**

Runoff = 0.55 cfs @ 12.13 hrs, Volume= 0.044 af, Depth&gt; 2.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

Area (sf)	CN	Description
* 9,015	98	impervious
* 932	74	hsgC grass, open
9,947	96	Weighted Average
932		9.37% Pervious Area
9,015		90.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 3S: DA-3 EASTERLY SITE TO EXISTING CATCH BASIN IN DRIVE**

Runoff = 2.80 cfs @ 12.14 hrs, Volume= 0.220 af, Depth&gt; 2.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

Area (sf)	CN	Description
* 41,229	98	impervious
* 6,247	74	hsgC grass, open, some mulch
* 4,922	72	hsgC wooded, trees
* 2,258	98	roof
54,656	93	Weighted Average
11,169		20.44% Pervious Area
43,487		79.56% Impervious Area

**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 2-yr Rainfall=3.14"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 4S: DA-4 TO CATCH BASINS**

Runoff = 0.45 cfs @ 12.14 hrs, Volume= 0.036 af, Depth&gt; 1.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Type III 24-hr 2-yr Rainfall=3.14"

Area (sf)	CN	Description
* 5,894	98	impervious
* 5,182	74	hsgC grass, open
11,076	87	Weighted Average
5,182		46.79% Pervious Area
5,894		53.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 5S: DA-5 TO CATCH BASINS**

Runoff = 1.73 cfs @ 12.13 hrs, Volume= 0.137 af, Depth&gt; 2.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Type III 24-hr 2-yr Rainfall=3.14"

Area (sf)	CN	Description
* 28,942	98	impervious
* 1,482	74	hsgC grass, open
30,424	97	Weighted Average
1,482		4.87% Pervious Area
28,942		95.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 6S: DA-6 RUNOFF TO SWALE ON WEST SIDE OF LOT**

Runoff = 4.68 cfs @ 12.15 hrs, Volume= 0.375 af, Depth&gt; 1.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Type III 24-hr 2-yr Rainfall=3.14"



**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 2-yr Rainfall=3.14"

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	Area (sf)	CN	Description
*	44,913	98	impervious
*	72,726	72	hsgC wooded, trees
*	12,925	98	roof
	130,564	84	Weighted Average
	72,726		55.70% Pervious Area
	57,838		44.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 7S: DA-7 WESTERLY SLOPE TO OFFSITE**

Runoff = 0.82 cfs @ 12.15 hrs, Volume= 0.065 af, Depth&gt; 1.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

	Area (sf)	CN	Description
*	9,091	98	impervious
*	13,655	74	hsgC grass, open
	22,746	84	Weighted Average
	13,655		60.03% Pervious Area
	9,091		39.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 8S: DA-8 OVERLAND TO LOWER POND**

Runoff = 0.10 cfs @ 12.13 hrs, Volume= 0.008 af, Depth&gt; 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

	Area (sf)	CN	Description
*	1,702	98	impervious
	1,702		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**189 MAY ST Fairlawn PREDEV**

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Type III 24-hr 2-yr Rainfall=3.14"

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**Summary for Subcatchment 9S: DA-9 EASTERLY SLOPE TO OFF SITE**

Runoff = 0.65 cfs @ 12.17 hrs, Volume= 0.056 af, Depth&gt; 0.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

	Area (sf)	CN	Description
*	1,737	98	impervious
*	13,161	74	hsgC grass, open
*	17,161	72	hsgC wooded, trees
	32,059	74	Weighted Average
	30,322		94.58% Pervious Area
	1,737		5.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 10S: DA-10 OVERLAND TO SMALL POND**

Runoff = 0.08 cfs @ 12.17 hrs, Volume= 0.007 af, Depth&gt; 0.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

	Area (sf)	CN	Description
*	3,852	74	hsgC grass, open
	3,852		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 16S: NORTH WING ROOF**

Runoff = 0.75 cfs @ 12.13 hrs, Volume= 0.059 af, Depth&gt; 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

	Area (sf)	CN	Description
*	12,979	98	roof
	12,979		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**189 MAY ST Fairlawn PREDEV**

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Type III 24-hr 2-yr Rainfall=3.14"

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**Summary for Reach 6R: Swale - runs W to N**

Inflow Area = 3.295 ac, 49.34% Impervious, Inflow Depth > 1.58" for 2-yr event  
 Inflow = 5.42 cfs @ 12.14 hrs, Volume= 0.434 af  
 Outflow = 5.32 cfs @ 12.19 hrs, Volume= 0.433 af, Atten= 2%, Lag= 2.9 min

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Max. Velocity= 3.38 fps, Min. Travel Time= 2.5 min  
 Avg. Velocity= 1.29 fps, Avg. Travel Time= 6.4 min

Peak Storage= 787 cf @ 12.19 hrs  
 Average Depth at Peak Storage= 0.31'  
 Bank-Full Depth= 1.50' Flow Area= 13.3 sf, Capacity= 106.43 cfs

4.00' x 1.50' deep channel, n= 0.025  
 Side Slope Z-value= 5.0 1.5 ' Top Width= 13.75'  
 Length= 500.0' Slope= 0.0200 '  
 Inlet Invert= 573.00', Outlet Invert= 563.00'

**Summary for Pond 1P: Northerly POND**

Inflow Area = 4.769 ac, 59.48% Impervious, Inflow Depth > 1.75" for 2-yr event  
 Inflow = 8.56 cfs @ 12.19 hrs, Volume= 0.697 af  
 Outflow = 8.83 cfs @ 12.20 hrs, Volume= 0.604 af, Atten= 0%, Lag= 0.9 min  
 Discarded = 0.06 cfs @ 12.20 hrs, Volume= 0.042 af  
 Primary = 8.77 cfs @ 12.20 hrs, Volume= 0.562 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Peak Elev= 562.98' @ 12.20 hrs Surf.Area= 2,561 sf Storage= 4,476 cf

Plug-Flow detention time= 58.7 min calculated for 0.604 af (87% of inflow)  
 Center-of-Mass det. time= 19.1 min ( 812.2 - 793.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	559.44'	7,541 cf	Northerly Pond from Swale (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
559.44	0	0	0
560.00	431	121	121
562.00	1,819	2,250	2,371
562.79	2,337	1,642	4,012
563.00	2,585	517	4,529
564.00	3,438	3,012	7,541

**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 2-yr Rainfall=3.14"

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Device	Routing	Invert	Outlet Devices
#1	Primary	562.78'	<b>40.0' long x 9.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.46 2.55 2.70 2.69 2.68 2.68 2.67 2.64 2.64 2.64 2.65 2.64 2.65 2.65 2.66 2.67 2.69
#2	Primary	563.30'	<b>40.0' long (Profile 29) Broad-Crested Rectangular Weir</b> Head (feet) 0.49 0.98 1.48 Coef. (English) 3.48 3.50 3.48
#3	Discarded	559.44'	<b>1.020 in/hr Exfiltration over Horizontal area</b>

**Discarded OutFlow** Max=0.06 cfs @ 12.20 hrs HW=562.98' (Free Discharge)↑**3=Exfiltration** (Exfiltration Controls 0.06 cfs)**Primary OutFlow** Max=8.72 cfs @ 12.20 hrs HW=562.98' (Free Discharge)↑**1=Broad-Crested Rectangular Weir** (Weir Controls 8.72 cfs @ 1.10 fps)↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)**Summary for Pond 2P: Small Det. Pond**

Inflow Area = 1.435 ac, 81.68% Impervious, Inflow Depth > 2.14" for 2-yr event  
 Inflow = 3.15 cfs @ 12.17 hrs, Volume= 0.256 af  
 Outflow = 3.15 cfs @ 12.18 hrs, Volume= 0.256 af, Atten= 0%, Lag= 0.5 min  
 Primary = 3.15 cfs @ 12.18 hrs, Volume= 0.256 af  
 Secondary = 0.00 cfs @ 10.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 577.40' @ 12.18 hrs Surf.Area= 77 sf Storage= 49 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 0.2 min ( 782.0 - 781.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	576.21'	457 cf	<b>Small Detention Pond (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
576.21	0	0	0
577.00	56	22	22
578.00	108	82	104
579.00	162	135	239
580.00	273	218	457

Device	Routing	Invert	Outlet Devices
#1	Primary	576.21'	<b>12.0" Round Culvert to Large Pond</b> L= 49.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 576.21' / 575.71' S= 0.0102 ' S= 0.0102 ' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	579.00'	<b>120.0 deg x 5.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir</b> Cv= 2.48 (C= 3.10)

**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 2-yr Rainfall=3.14"

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**Primary OutFlow** Max=3.06 cfs @ 12.18 hrs HW=577.36' TW=562.97' (Dynamic Tailwater)

↑1=Culvert to Large Pond (Inlet Controls 3.06 cfs @ 3.89 fps)

**Secondary OutFlow** Max=0.00 cfs @ 10.00 hrs HW=576.38' TW=559.69' (Dynamic Tailwater)

↑2=Sharp-Crested Vee/Trap Weir (Controls 0.00 cfs)

**Summary for Pond 3P: CB IN MAIN DRIVEWAY TO ABUTTING LOT**

Inflow Area = 1.255 ac, 79.56% Impervious, Inflow Depth > 2.11" for 2-yr event  
 Inflow = 2.80 cfs @ 12.14 hrs, Volume= 0.220 af  
 Outflow = 2.80 cfs @ 12.14 hrs, Volume= 0.220 af, Atten= 0%, Lag= 0.0 min  
 Primary = 2.80 cfs @ 12.14 hrs, Volume= 0.220 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 578.04' @ 12.13 hrs

Flood Elev= 584.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	577.00'	<b>12.0" Round Culvert</b> L= 68.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 577.00' / 571.56' S= 0.0800 ' S= 0.0800 ' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

**Primary OutFlow** Max=2.65 cfs @ 12.14 hrs HW=577.99' (Free Discharge)

↑1=Culvert (Inlet Controls 2.65 cfs @ 3.38 fps)

**Summary for Pond 8R: DMH with 15" Drainage Pipe**

Inflow Area = 0.394 ac, 94.56% Impervious, Inflow Depth > 2.34" for 2-yr event  
 Inflow = 0.97 cfs @ 12.13 hrs, Volume= 0.077 af  
 Outflow = 0.97 cfs @ 12.13 hrs, Volume= 0.077 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.97 cfs @ 12.13 hrs, Volume= 0.077 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 580.88' @ 12.17 hrs

Flood Elev= 585.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	580.38'	<b>15.0" Round Culvert</b> L= 95.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 580.38' / 579.36' S= 0.0107 ' S= 0.0107 ' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=0.80 cfs @ 12.13 hrs HW=580.86' TW=580.32' (Dynamic Tailwater)

↑1=Culvert (Outlet Controls 0.80 cfs @ 2.72 fps)

**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 2-yr Rainfall=3.14"

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**Summary for Pond 11R: DMH with 15" Drainage Pipe**

Inflow Area = 0.953 ac, 83.94% Impervious, Inflow Depth > 2.18" for 2-yr event  
 Inflow = 2.18 cfs @ 12.14 hrs, Volume= 0.173 af  
 Outflow = 2.18 cfs @ 12.14 hrs, Volume= 0.173 af, Atten= 0%, Lag= 0.0 min  
 Primary = 2.18 cfs @ 12.14 hrs, Volume= 0.173 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 581.92' @ 12.14 hrs

Flood Elev= 586.35'

Device	Routing	Invert	Outlet Devices
#1	Primary	581.06'	<b>15.0" Round Culvert</b> L= 177.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 581.06' / 580.39' S= 0.0038 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=2.06 cfs @ 12.14 hrs HW=581.89' TW=580.32' (Dynamic Tailwater)**1=Culvert** (Barrel Controls 2.06 cfs @ 3.36 fps)**Summary for Pond 12R: DMH 12 OUT TO SMALL POND**

Inflow Area = 1.346 ac, 87.05% Impervious, Inflow Depth > 2.22" for 2-yr event  
 Inflow = 3.15 cfs @ 12.13 hrs, Volume= 0.249 af  
 Outflow = 3.08 cfs @ 12.17 hrs, Volume= 0.249 af, Atten= 2%, Lag= 2.2 min  
 Primary = 3.08 cfs @ 12.17 hrs, Volume= 0.249 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 580.36' @ 12.17 hrs Surf.Area= 321 sf Storage= 175 cf

Flood Elev= 586.31' Surf.Area= 25 sf Storage= 496 cf

Plug-Flow detention time= 1.0 min calculated for 0.249 af (100% of inflow)

Center-of-Mass det. time= 0.7 min ( 780.8 - 780.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	579.36'	87 cf	<b>4.00'D x 6.95'H Vertical Cone/Cylinder</b>
#2	579.36'	217 cf	<b>15.0" Round Pipe Storage</b> L= 177.0' S= 0.0038 '/'
#3	579.36'	117 cf	<b>15.0" Round Pipe Storage</b> L= 95.0' S= 0.0107 '/'
#4	580.39'	78 cf	<b>4.00'D x 6.23'H Vertical Cone/Cylinder</b>
		499 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	579.36'	<b>15.0" Round Culvert</b> L= 61.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 579.36' / 578.98' S= 0.0062 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=2.95 cfs @ 12.17 hrs HW=580.34' TW=577.35' (Dynamic Tailwater)**1=Culvert** (Barrel Controls 2.95 cfs @ 3.95 fps)

**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 10-yr Rainfall=4.87"

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**Summary for Subcatchment 1S: DA-1 TO CATCH BASINS**

Runoff = 0.65 cfs @ 12.13 hrs, Volume= 0.052 af, Depth&gt; 3.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

Area (sf)	CN	Description
* 7,195	98	impervious
7,195		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 2S: DA-2 TO CATCH BASINS**

Runoff = 0.88 cfs @ 12.13 hrs, Volume= 0.070 af, Depth&gt; 3.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

Area (sf)	CN	Description
* 9,015	98	impervious
* 932	74	hsgC grass, open
9,947	96	Weighted Average
932		9.37% Pervious Area
9,015		90.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 3S: DA-3 EASTERLY SITE TO EXISTING CATCH BASIN IN DRIVE**

Runoff = 4.65 cfs @ 12.13 hrs, Volume= 0.366 af, Depth&gt; 3.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

Area (sf)	CN	Description
* 41,229	98	impervious
* 6,247	74	hsgC grass, open, some mulch
* 4,922	72	hsgC wooded, trees
* 2,258	98	roof
54,656	93	Weighted Average
11,169		20.44% Pervious Area
43,487		79.56% Impervious Area



**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 10-yr Rainfall=4.87"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 4S: DA-4 TO CATCH BASINS**

Runoff = 0.83 cfs @ 12.14 hrs, Volume= 0.065 af, Depth&gt; 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Type III 24-hr 10-yr Rainfall=4.87"

Area (sf)	CN	Description
* 5,894	98	impervious
* 5,182	74	hsgC grass, open
11,076	87	Weighted Average
5,182		46.79% Pervious Area
5,894		53.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 5S: DA-5 TO CATCH BASINS**

Runoff = 2.73 cfs @ 12.13 hrs, Volume= 0.216 af, Depth&gt; 3.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Type III 24-hr 10-yr Rainfall=4.87"

Area (sf)	CN	Description
* 28,942	98	impervious
* 1,482	74	hsgC grass, open
30,424	97	Weighted Average
1,482		4.87% Pervious Area
28,942		95.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 6S: DA-6 RUNOFF TO SWALE ON WEST SIDE OF LOT**

Runoff = 9.02 cfs @ 12.14 hrs, Volume= 0.713 af, Depth&gt; 2.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Type III 24-hr 10-yr Rainfall=4.87"

**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 10-yr Rainfall=4.87"

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	Area (sf)	CN	Description
*	44,913	98	impervious
*	72,726	72	hsgC wooded, trees
*	12,925	98	roof
	130,564	84	Weighted Average
	72,726		55.70% Pervious Area
	57,838		44.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 7S: DA-7 WESTERLY SLOPE TO OFFSITE**

Runoff = 1.57 cfs @ 12.14 hrs, Volume= 0.124 af, Depth&gt; 2.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

	Area (sf)	CN	Description
*	9,091	98	impervious
*	13,655	74	hsgC grass, open
	22,746	84	Weighted Average
	13,655		60.03% Pervious Area
	9,091		39.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 8S: DA-8 OVERLAND TO LOWER POND**

Runoff = 0.15 cfs @ 12.13 hrs, Volume= 0.012 af, Depth&gt; 3.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

	Area (sf)	CN	Description
*	1,702	98	impervious
	1,702		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

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Type III 24-hr 10-yr Rainfall=4.87"

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**Summary for Subcatchment 9S: DA-9 EASTERLY SLOPE TO OFF SITE**

Runoff = 1.58 cfs @ 12.15 hrs, Volume= 0.128 af, Depth> 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Type III 24-hr 10-yr Rainfall=4.87"

	Area (sf)	CN	Description
*	1,737	98	impervious
*	13,161	74	hsgC grass, open
*	17,161	72	hsgC wooded, trees
	32,059	74	Weighted Average
	30,322		94.58% Pervious Area
	1,737		5.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 10S: DA-10 OVERLAND TO SMALL POND**

Runoff = 0.19 cfs @ 12.15 hrs, Volume= 0.015 af, Depth> 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Type III 24-hr 10-yr Rainfall=4.87"

	Area (sf)	CN	Description
*	3,852	74	hsgC grass, open
	3,852		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 16S: NORTH WING ROOF**

Runoff = 1.17 cfs @ 12.13 hrs, Volume= 0.093 af, Depth> 3.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Type III 24-hr 10-yr Rainfall=4.87"

	Area (sf)	CN	Description
*	12,979	98	roof
	12,979		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 10-yr Rainfall=4.87"

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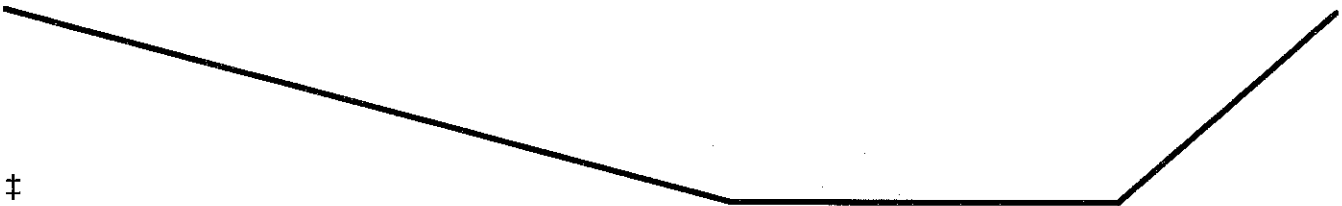
**Summary for Reach 6R: Swale - runs W to N**

Inflow Area = 3.295 ac, 49.34% Impervious, Inflow Depth > 2.94" for 10-yr event  
 Inflow = 10.19 cfs @ 12.14 hrs, Volume= 0.806 af  
 Outflow = 9.99 cfs @ 12.18 hrs, Volume= 0.804 af, Atten= 2%, Lag= 2.6 min

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Max. Velocity= 4.11 fps, Min. Travel Time= 2.0 min  
 Avg. Velocity= 1.62 fps, Avg. Travel Time= 5.2 min

Peak Storage= 1,213 cf @ 12.18 hrs  
 Average Depth at Peak Storage= 0.45'  
 Bank-Full Depth= 1.50' Flow Area= 13.3 sf, Capacity= 106.43 cfs

4.00' x 1.50' deep channel, n= 0.025  
 Side Slope Z-value= 5.0 1.5 ' Top Width= 13.75'  
 Length= 500.0' Slope= 0.0200 '  
 Inlet Invert= 573.00', Outlet Invert= 563.00'

**Summary for Pond 1P: Northerly POND**

Inflow Area = 4.769 ac, 59.48% Impervious, Inflow Depth > 3.11" for 10-yr event  
 Inflow = 15.21 cfs @ 12.19 hrs, Volume= 1.234 af  
 Outflow = 15.27 cfs @ 12.20 hrs, Volume= 1.142 af, Atten= 0%, Lag= 0.6 min  
 Discarded = 0.06 cfs @ 12.20 hrs, Volume= 0.044 af  
 Primary = 15.21 cfs @ 12.20 hrs, Volume= 1.098 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Peak Elev= 563.07' @ 12.20 hrs Surf.Area= 2,641 sf Storage= 4,699 cf

Plug-Flow detention time= 38.1 min calculated for 1.141 af (92% of inflow)  
 Center-of-Mass det. time= 12.4 min ( 799.8 - 787.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	559.44'	7,541 cf	Northerly Pond from Swale (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
559.44	0	0	0
560.00	431	121	121
562.00	1,819	2,250	2,371
562.79	2,337	1,642	4,012
563.00	2,585	517	4,529
564.00	3,438	3,012	7,541

**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 10-yr Rainfall=4.87"

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Device	Routing	Invert	Outlet Devices
#1	Primary	562.78'	<b>40.0' long x 9.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.46 2.55 2.70 2.69 2.68 2.68 2.67 2.64 2.64 2.64 2.65 2.64 2.65 2.65 2.66 2.67 2.69
#2	Primary	563.30'	<b>40.0' long (Profile 29) Broad-Crested Rectangular Weir</b> Head (feet) 0.49 0.98 1.48 Coef. (English) 3.48 3.50 3.48
#3	Discarded	559.44'	<b>1.020 in/hr Exfiltration over Horizontal area</b>

**Discarded OutFlow** Max=0.06 cfs @ 12.20 hrs HW=563.06' (Free Discharge)↑ **3=Exfiltration** (Exfiltration Controls 0.06 cfs)**Primary OutFlow** Max=15.06 cfs @ 12.20 hrs HW=563.06' (Free Discharge)↑ **1=Broad-Crested Rectangular Weir** (Weir Controls 15.06 cfs @ 1.33 fps)↑ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)**Summary for Pond 2P: Small Det. Pond**

Inflow Area = 1.435 ac, 81.68% Impervious, Inflow Depth > 3.50" for 10-yr event  
 Inflow = 5.16 cfs @ 12.17 hrs, Volume= 0.418 af  
 Outflow = 5.07 cfs @ 12.19 hrs, Volume= 0.418 af, Atten= 2%, Lag= 1.1 min  
 Primary = 5.07 cfs @ 12.19 hrs, Volume= 0.418 af  
 Secondary = 0.00 cfs @ 10.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 578.53' @ 12.19 hrs Surf.Area= 137 sf Storage= 169 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 0.2 min ( 780.0 - 779.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	576.21'	457 cf	<b>Small Detention Pond (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
576.21	0	0	0
577.00	56	22	22
578.00	108	82	104
579.00	162	135	239
580.00	273	218	457

Device	Routing	Invert	Outlet Devices
#1	Primary	576.21'	<b>12.0" Round Culvert to Large Pond</b> L= 49.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 576.21' / 575.71' S= 0.0102' /' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	579.00'	<b>120.0 deg x 5.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir</b> Cv= 2.48 (C= 3.10)

**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 10-yr Rainfall=4.87"

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**Primary OutFlow** Max=4.99 cfs @ 12.19 hrs HW=578.47' TW=563.06' (Dynamic Tailwater)

↑1=Culvert to Large Pond (Barrel Controls 4.99 cfs @ 6.36 fps)

**Secondary OutFlow** Max=0.00 cfs @ 10.00 hrs HW=576.43' TW=559.80' (Dynamic Tailwater)

↑2=Sharp-Crested Vee/Trap Weir (Controls 0.00 cfs)

**Summary for Pond 3P: CB IN MAIN DRIVEWAY TO ABUTTING LOT**

Inflow Area = 1.255 ac, 79.56% Impervious, Inflow Depth > 3.50" for 10-yr event  
 Inflow = 4.65 cfs @ 12.13 hrs, Volume= 0.366 af  
 Outflow = 4.65 cfs @ 12.13 hrs, Volume= 0.366 af, Atten= 0%, Lag= 0.0 min  
 Primary = 4.65 cfs @ 12.13 hrs, Volume= 0.366 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 578.98' @ 12.13 hrs

Flood Elev= 584.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	577.00'	<b>12.0" Round Culvert</b> L= 68.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 577.00' / 571.56' S= 0.0800 ' S= 0.0800 ' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

**Primary OutFlow** Max=4.40 cfs @ 12.13 hrs HW=578.86' (Free Discharge)

↑1=Culvert (Inlet Controls 4.40 cfs @ 5.61 fps)

**Summary for Pond 8R: DMH with 15" Drainage Pipe**

Inflow Area = 0.394 ac, 94.56% Impervious, Inflow Depth > 3.70" for 10-yr event  
 Inflow = 1.53 cfs @ 12.13 hrs, Volume= 0.121 af  
 Outflow = 1.53 cfs @ 12.13 hrs, Volume= 0.121 af, Atten= 0%, Lag= 0.0 min  
 Primary = 1.53 cfs @ 12.13 hrs, Volume= 0.121 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 581.10' @ 12.21 hrs

Flood Elev= 585.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	580.38'	<b>15.0" Round Culvert</b> L= 95.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 580.38' / 579.36' S= 0.0107 ' S= 0.0107 ' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=1.09 cfs @ 12.13 hrs HW=581.04' TW=580.71' (Dynamic Tailwater)

↑1=Culvert (Outlet Controls 1.09 cfs @ 2.39 fps)

**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 10-yr Rainfall=4.87"

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**Summary for Pond 11R: DMH with 15" Drainage Pipe**

Inflow Area = 0.953 ac, 83.94% Impervious, Inflow Depth > 3.55" for 10-yr event  
 Inflow = 3.55 cfs @ 12.13 hrs, Volume= 0.282 af  
 Outflow = 3.55 cfs @ 12.13 hrs, Volume= 0.282 af, Atten= 0%, Lag= 0.0 min  
 Primary = 3.55 cfs @ 12.13 hrs, Volume= 0.282 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 582.24' @ 12.13 hrs

Flood Elev= 586.35'

Device	Routing	Invert	Outlet Devices
#1	Primary	581.06'	<b>15.0" Round Culvert</b> L= 177.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 581.06' / 580.39' S= 0.0038 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=3.37 cfs @ 12.13 hrs HW=582.20' TW=580.71' (Dynamic Tailwater)**1=Culvert** (Barrel Controls 3.37 cfs @ 3.77 fps)**Summary for Pond 12R: DMH 12 OUT TO SMALL POND**

Inflow Area = 1.346 ac, 87.05% Impervious, Inflow Depth > 3.59" for 10-yr event  
 Inflow = 5.09 cfs @ 12.13 hrs, Volume= 0.403 af  
 Outflow = 4.97 cfs @ 12.17 hrs, Volume= 0.403 af, Atten= 2%, Lag= 2.2 min  
 Primary = 4.97 cfs @ 12.17 hrs, Volume= 0.403 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 580.79' @ 12.17 hrs Surf.Area= 224 sf Storage= 303 cf

Flood Elev= 586.31' Surf.Area= 25 sf Storage= 496 cf

Plug-Flow detention time= 1.1 min calculated for 0.399 af (99% of inflow)

Center-of-Mass det. time= 0.7 min ( 778.9 - 778.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	579.36'	87 cf	<b>4.00'D x 6.95'H Vertical Cone/Cylinder</b>
#2	579.36'	217 cf	<b>15.0" Round Pipe Storage</b> L= 177.0' S= 0.0038 '/'
#3	579.36'	117 cf	<b>15.0" Round Pipe Storage</b> L= 95.0' S= 0.0107 '/'
#4	580.39'	78 cf	<b>4.00'D x 6.23'H Vertical Cone/Cylinder</b>
		499 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	579.36'	<b>15.0" Round Culvert</b> L= 61.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 579.36' / 578.98' S= 0.0062 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=4.78 cfs @ 12.17 hrs HW=580.74' TW=578.38' (Dynamic Tailwater)**1=Culvert** (Barrel Controls 4.78 cfs @ 4.38 fps)



**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 25-yr Rainfall=5.95"

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**Summary for Subcatchment 1S: DA-1 TO CATCH BASINS**

Runoff = 0.80 cfs @ 12.13 hrs, Volume= 0.063 af, Depth&gt; 4.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

Area (sf)	CN	Description
* 7,195	98	impervious
7,195		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 2S: DA-2 TO CATCH BASINS**

Runoff = 1.09 cfs @ 12.13 hrs, Volume= 0.086 af, Depth&gt; 4.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

Area (sf)	CN	Description
* 9,015	98	impervious
* 932	74	hsgC grass, open
9,947	96	Weighted Average
932		9.37% Pervious Area
9,015		90.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 3S: DA-3 EASTERLY SITE TO EXISTING CATCH BASIN IN DRIVE**

Runoff = 5.78 cfs @ 12.13 hrs, Volume= 0.457 af, Depth&gt; 4.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

Area (sf)	CN	Description
* 41,229	98	impervious
* 6,247	74	hsgC grass, open, some mulch
* 4,922	72	hsgC wooded, trees
* 2,258	98	roof
54,656	93	Weighted Average
11,169		20.44% Pervious Area
43,487		79.56% Impervious Area

**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 25-yr Rainfall=5.95"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 4S: DA-4 TO CATCH BASINS**

Runoff = 1.06 cfs @ 12.14 hrs, Volume= 0.084 af, Depth&gt; 3.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

	Area (sf)	CN	Description
*	5,894	98	impervious
*	5,182	74	hsgC grass, open
	11,076	87	Weighted Average
	5,182		46.79% Pervious Area
	5,894		53.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 5S: DA-5 TO CATCH BASINS**

Runoff = 3.35 cfs @ 12.13 hrs, Volume= 0.266 af, Depth&gt; 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

	Area (sf)	CN	Description
*	28,942	98	impervious
*	1,482	74	hsgC grass, open
	30,424	97	Weighted Average
	1,482		4.87% Pervious Area
	28,942		95.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 6S: DA-6 RUNOFF TO SWALE ON WEST SIDE OF LOT**

Runoff = 11.79 cfs @ 12.14 hrs, Volume= 0.930 af, Depth&gt; 3.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

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Type III 24-hr 25-yr Rainfall=5.95"

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	Area (sf)	CN	Description
*	44,913	98	impervious
*	72,726	72	hsgC wooded, trees
*	12,925	98	roof
	130,564	84	Weighted Average
	72,726		55.70% Pervious Area
	57,838		44.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 7S: DA-7 WESTERLY SLOPE TO OFFSITE**

Runoff = 2.05 cfs @ 12.14 hrs, Volume= 0.162 af, Depth&gt; 3.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

	Area (sf)	CN	Description
*	9,091	98	impervious
*	13,655	74	hsgC grass, open
	22,746	84	Weighted Average
	13,655		60.03% Pervious Area
	9,091		39.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 8S: DA-8 OVERLAND TO LOWER POND**

Runoff = 0.19 cfs @ 12.13 hrs, Volume= 0.015 af, Depth&gt; 4.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

	Area (sf)	CN	Description
*	1,702	98	impervious
	1,702		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

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Type III 24-hr 25-yr Rainfall=5.95"

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**Summary for Subcatchment 9S: DA-9 EASTERLY SLOPE TO OFF SITE**

Runoff = 2.21 cfs @ 12.15 hrs, Volume= 0.177 af, Depth&gt; 2.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

	Area (sf)	CN	Description
*	1,737	98	impervious
*	13,161	74	hsgC grass, open
*	17,161	72	hsgC wooded, trees
	32,059	74	Weighted Average
	30,322		94.58% Pervious Area
	1,737		5.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 10S: DA-10 OVERLAND TO SMALL POND**

Runoff = 0.27 cfs @ 12.15 hrs, Volume= 0.021 af, Depth&gt; 2.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

	Area (sf)	CN	Description
*	3,852	74	hsgC grass, open
	3,852		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 16S: NORTH WING ROOF**

Runoff = 1.43 cfs @ 12.13 hrs, Volume= 0.114 af, Depth&gt; 4.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

	Area (sf)	CN	Description
*	12,979	98	roof
	12,979		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

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Type III 24-hr 25-yr Rainfall=5.95"

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**Summary for Reach 6R: Swale - runs W to N**

Inflow Area = 3.295 ac, 49.34% Impervious, Inflow Depth > 3.80" for 25-yr event  
 Inflow = 13.23 cfs @ 12.14 hrs, Volume= 1.044 af  
 Outflow = 12.96 cfs @ 12.18 hrs, Volume= 1.041 af, Atten= 2%, Lag= 2.5 min

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Max. Velocity= 4.44 fps, Min. Travel Time= 1.9 min  
 Avg. Velocity= 1.77 fps, Avg. Travel Time= 4.7 min

Peak Storage= 1,455 cf @ 12.18 hrs  
 Average Depth at Peak Storage= 0.51'  
 Bank-Full Depth= 1.50' Flow Area= 13.3 sf, Capacity= 106.43 cfs

4.00' x 1.50' deep channel, n= 0.025  
 Side Slope Z-value= 5.0 1.5 ' Top Width= 13.75'  
 Length= 500.0' Slope= 0.0200 '  
 Inlet Invert= 573.00', Outlet Invert= 563.00'

**Summary for Pond 1P: Northerly POND**

Inflow Area = 4.769 ac, 59.48% Impervious, Inflow Depth > 3.97" for 25-yr event  
 Inflow = 19.67 cfs @ 12.18 hrs, Volume= 1.576 af  
 Outflow = 19.71 cfs @ 12.19 hrs, Volume= 1.483 af, Atten= 0%, Lag= 0.5 min  
 Discarded = 0.06 cfs @ 12.19 hrs, Volume= 0.045 af  
 Primary = 19.65 cfs @ 12.19 hrs, Volume= 1.438 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Peak Elev= 563.12' @ 12.19 hrs Surf.Area= 2,684 sf Storage= 4,835 cf

Plug-Flow detention time= 31.4 min calculated for 1.482 af (94% of inflow)  
 Center-of-Mass det. time= 10.2 min ( 795.6 - 785.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	559.44'	7,541 cf	Northerly Pond from Swale (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
559.44	0	0	0
560.00	431	121	121
562.00	1,819	2,250	2,371
562.79	2,337	1,642	4,012
563.00	2,585	517	4,529
564.00	3,438	3,012	7,541

**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 25-yr Rainfall=5.95"

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Device	Routing	Invert	Outlet Devices
#1	Primary	562.78'	<b>40.0' long x 9.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.46 2.55 2.70 2.69 2.68 2.68 2.67 2.64 2.64 2.64 2.65 2.64 2.65 2.65 2.66 2.67 2.69
#2	Primary	563.30'	<b>40.0' long (Profile 29) Broad-Crested Rectangular Weir</b> Head (feet) 0.49 0.98 1.48 Coef. (English) 3.48 3.50 3.48
#3	Discarded	559.44'	<b>1.020 in/hr Exfiltration over Horizontal area</b>

**Discarded OutFlow** Max=0.06 cfs @ 12.19 hrs HW=563.11' (Free Discharge)  
 ↳ **3=Exfiltration** (Exfiltration Controls 0.06 cfs)

**Primary OutFlow** Max=19.37 cfs @ 12.19 hrs HW=563.11' (Free Discharge)  
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 19.37 cfs @ 1.45 fps)  
 ↳ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

**Summary for Pond 2P: Small Det. Pond**

Inflow Area = 1.435 ac, 81.68% Impervious, Inflow Depth > 4.35" for 25-yr event  
 Inflow = 6.51 cfs @ 12.17 hrs, Volume= 0.520 af  
 Outflow = 6.55 cfs @ 12.19 hrs, Volume= 0.520 af, Atten= 0%, Lag= 1.2 min  
 Primary = 5.86 cfs @ 12.19 hrs, Volume= 0.514 af  
 Secondary = 0.70 cfs @ 12.20 hrs, Volume= 0.006 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Peak Elev= 579.14' @ 12.19 hrs Surf.Area= 177 sf Storage= 262 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 0.3 min ( 779.4 - 779.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	576.21'	457 cf	<b>Small Detention Pond (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
576.21	0	0	0
577.00	56	22	22
578.00	108	82	104
579.00	162	135	239
580.00	273	218	457

Device	Routing	Invert	Outlet Devices
#1	Primary	576.21'	<b>12.0" Round Culvert to Large Pond</b> L= 49.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 576.21' / 575.71' S= 0.0102 ' S= 0.0102 ' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	579.00'	<b>120.0 deg x 5.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir</b> Cv= 2.48 (C= 3.10)

**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 25-yr Rainfall=5.95"

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**Primary OutFlow** Max=5.76 cfs @ 12.19 hrs HW=579.06' TW=563.11' (Dynamic Tailwater)

↑1=Culvert to Large Pond (Barrel Controls 5.76 cfs @ 7.33 fps)

**Secondary OutFlow** Max=0.70 cfs @ 12.20 hrs HW=579.12' TW=563.12' (Dynamic Tailwater)

↑2=Sharp-Crested Vee/Trap Weir (Weir Controls 0.70 cfs @ 1.08 fps)

**Summary for Pond 3P: CB IN MAIN DRIVEWAY TO ABUTTING LOT**

Inflow Area = 1.255 ac, 79.56% Impervious, Inflow Depth > 4.37" for 25-yr event  
 Inflow = 5.78 cfs @ 12.13 hrs, Volume= 0.457 af  
 Outflow = 5.78 cfs @ 12.13 hrs, Volume= 0.457 af, Atten= 0%, Lag= 0.0 min  
 Primary = 5.78 cfs @ 12.13 hrs, Volume= 0.457 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 579.80' @ 12.13 hrs

Flood Elev= 584.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	577.00'	<b>12.0" Round Culvert</b> L= 68.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 577.00' / 571.56' S= 0.0800 ' / Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

**Primary OutFlow** Max=5.48 cfs @ 12.13 hrs HW=579.60' (Free Discharge)

↑1=Culvert (Inlet Controls 5.48 cfs @ 6.98 fps)

**Summary for Pond 8R: DMH with 15" Drainage Pipe**

Inflow Area = 0.394 ac, 94.56% Impervious, Inflow Depth > 4.55" for 25-yr event  
 Inflow = 1.88 cfs @ 12.13 hrs, Volume= 0.149 af  
 Outflow = 1.88 cfs @ 12.13 hrs, Volume= 0.149 af, Atten= 0%, Lag= 0.0 min  
 Primary = 1.88 cfs @ 12.13 hrs, Volume= 0.149 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 581.43' @ 12.26 hrs

Flood Elev= 585.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	580.38'	<b>15.0" Round Culvert</b> L= 95.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 580.38' / 579.36' S= 0.0107 ' / Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=0.52 cfs @ 12.13 hrs HW=581.19' TW=581.15' (Dynamic Tailwater)

↑1=Culvert (Outlet Controls 0.52 cfs @ 0.87 fps)



**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 25-yr Rainfall=5.95"

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**Summary for Pond 11R: DMH with 15" Drainage Pipe**

Inflow Area = 0.953 ac, 83.94% Impervious, Inflow Depth > 4.40" for 25-yr event  
 Inflow = 4.41 cfs @ 12.13 hrs, Volume= 0.349 af  
 Outflow = 4.41 cfs @ 12.13 hrs, Volume= 0.349 af, Atten= 0%, Lag= 0.0 min  
 Primary = 4.41 cfs @ 12.13 hrs, Volume= 0.349 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 582.47' @ 12.13 hrs

Flood Elev= 586.35'

Device	Routing	Invert	Outlet Devices
#1	Primary	581.06'	<b>15.0" Round Culvert</b> L= 177.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 581.06' / 580.39' S= 0.0038 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=4.18 cfs @ 12.13 hrs HW=582.41' TW=581.15' (Dynamic Tailwater)**1=Culvert** (Barrel Controls 4.18 cfs @ 3.93 fps)**Summary for Pond 12R: DMH 12 OUT TO SMALL POND**

Inflow Area = 1.346 ac, 87.05% Impervious, Inflow Depth > 4.45" for 25-yr event  
 Inflow = 6.29 cfs @ 12.13 hrs, Volume= 0.499 af  
 Outflow = 6.26 cfs @ 12.17 hrs, Volume= 0.499 af, Atten= 1%, Lag= 2.3 min  
 Primary = 6.26 cfs @ 12.17 hrs, Volume= 0.499 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 581.33' @ 12.17 hrs Surf.Area= 46 sf Storage= 368 cf

Flood Elev= 586.31' Surf.Area= 25 sf Storage= 496 cf

Plug-Flow detention time= 1.1 min calculated for 0.493 af (99% of inflow)

Center-of-Mass det. time= 0.7 min ( 778.2 - 777.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	579.36'	87 cf	<b>4.00'D x 6.95'H Vertical Cone/Cylinder</b>
#2	579.36'	217 cf	<b>15.0" Round Pipe Storage</b> L= 177.0' S= 0.0038 '/'
#3	579.36'	117 cf	<b>15.0" Round Pipe Storage</b> L= 95.0' S= 0.0107 '/'
#4	580.39'	78 cf	<b>4.00'D x 6.23'H Vertical Cone/Cylinder</b>
		499 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	579.36'	<b>15.0" Round Culvert</b> L= 61.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 579.36' / 578.98' S= 0.0062 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=5.99 cfs @ 12.17 hrs HW=581.23' TW=578.99' (Dynamic Tailwater)**1=Culvert** (Barrel Controls 5.99 cfs @ 4.88 fps)

**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 100-yr Rainfall=7.61"

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**Summary for Subcatchment 1S: DA-1 TO CATCH BASINS**

Runoff = 1.02 cfs @ 12.13 hrs, Volume= 0.081 af, Depth&gt; 5.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

Area (sf)	CN	Description
* 7,195	98	impervious
7,195		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 2S: DA-2 TO CATCH BASINS**

Runoff = 1.40 cfs @ 12.13 hrs, Volume= 0.111 af, Depth&gt; 5.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

Area (sf)	CN	Description
* 9,015	98	impervious
* 932	74	hsgC grass, open
9,947	96	Weighted Average
932		9.37% Pervious Area
9,015		90.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 3S: DA-3 EASTERLY SITE TO EXISTING CATCH BASIN IN DRIVE**

Runoff = 7.52 cfs @ 12.13 hrs, Volume= 0.595 af, Depth&gt; 5.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

Area (sf)	CN	Description
* 41,229	98	impervious
* 6,247	74	hsgC grass, open, some mulch
* 4,922	72	hsgC wooded, trees
* 2,258	98	roof
54,656	93	Weighted Average
11,169		20.44% Pervious Area
43,487		79.56% Impervious Area

**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 100-yr Rainfall=7.61"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 4S: DA-4 TO CATCH BASINS**

Runoff = 1.43 cfs @ 12.14 hrs, Volume= 0.112 af, Depth&gt; 5.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Type III 24-hr 100-yr Rainfall=7.61"

Area (sf)	CN	Description
* 5,894	98	impervious
* 5,182	74	hsgC grass, open
11,076	87	Weighted Average
5,182		46.79% Pervious Area
5,894		53.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 5S: DA-5 TO CATCH BASINS**

Runoff = 4.29 cfs @ 12.13 hrs, Volume= 0.341 af, Depth&gt; 5.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Type III 24-hr 100-yr Rainfall=7.61"

Area (sf)	CN	Description
* 28,942	98	impervious
* 1,482	74	hsgC grass, open
30,424	97	Weighted Average
1,482		4.87% Pervious Area
28,942		95.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 6S: DA-6 RUNOFF TO SWALE ON WEST SIDE OF LOT**

Runoff = 16.06 cfs @ 12.14 hrs, Volume= 1.265 af, Depth&gt; 5.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Type III 24-hr 100-yr Rainfall=7.61"

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Type III 24-hr 100-yr Rainfall=7.61"

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	Area (sf)	CN	Description
*	44,913	98	impervious
*	72,726	72	hsgC wooded, trees
*	12,925	98	roof
	130,564	84	Weighted Average
	72,726		55.70% Pervious Area
	57,838		44.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 7S: DA-7 WESTERLY SLOPE TO OFFSITE**

Runoff = 2.80 cfs @ 12.14 hrs, Volume= 0.220 af, Depth&gt; 5.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

	Area (sf)	CN	Description
*	9,091	98	impervious
*	13,655	74	hsgC grass, open
	22,746	84	Weighted Average
	13,655		60.03% Pervious Area
	9,091		39.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 8S: DA-8 OVERLAND TO LOWER POND**

Runoff = 0.24 cfs @ 12.13 hrs, Volume= 0.019 af, Depth&gt; 5.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

	Area (sf)	CN	Description
*	1,702	98	impervious
	1,702		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

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Type III 24-hr 100-yr Rainfall=7.61"

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**Summary for Subcatchment 9S: DA-9 EASTERLY SLOPE TO OFF SITE**

Runoff = 3.23 cfs @ 12.14 hrs, Volume= 0.256 af, Depth> 4.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Type III 24-hr 100-yr Rainfall=7.61"

	Area (sf)	CN	Description
*	1,737	98	impervious
*	13,161	74	hsgC grass, open
*	17,161	72	hsgC wooded, trees
	32,059	74	Weighted Average
	30,322		94.58% Pervious Area
	1,737		5.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 10S: DA-10 OVERLAND TO SMALL POND**

Runoff = 0.39 cfs @ 12.14 hrs, Volume= 0.031 af, Depth> 4.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Type III 24-hr 100-yr Rainfall=7.61"

	Area (sf)	CN	Description
*	3,852	74	hsgC grass, open
	3,852		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 16S: NORTH WING ROOF**

Runoff = 1.84 cfs @ 12.13 hrs, Volume= 0.146 af, Depth> 5.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Type III 24-hr 100-yr Rainfall=7.61"

	Area (sf)	CN	Description
*	12,979	98	roof
	12,979		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 100-yr Rainfall=7.61"

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**Summary for Reach 6R: Swale - runs W to N**

Inflow Area = 3.295 ac, 49.34% Impervious, Inflow Depth > 5.14" for 100-yr event  
 Inflow = 17.90 cfs @ 12.14 hrs, Volume= 1.411 af  
 Outflow = 17.52 cfs @ 12.18 hrs, Volume= 1.408 af, Atten= 2%, Lag= 2.4 min

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Max. Velocity= 4.85 fps, Min. Travel Time= 1.7 min  
 Avg. Velocity= 1.97 fps, Avg. Travel Time= 4.2 min

Peak Storage= 1,801 cf @ 12.18 hrs  
 Average Depth at Peak Storage= 0.60'  
 Bank-Full Depth= 1.50' Flow Area= 13.3 sf, Capacity= 106.43 cfs

4.00' x 1.50' deep channel, n= 0.025  
 Side Slope Z-value= 5.0 1.5 ' Top Width= 13.75'  
 Length= 500.0' Slope= 0.0200 '  
 Inlet Invert= 573.00', Outlet Invert= 563.00'

**Summary for Pond 1P: Northerly POND**

Inflow Area = 4.769 ac, 59.48% Impervious, Inflow Depth > 5.29" for 100-yr event  
 Inflow = 26.38 cfs @ 12.18 hrs, Volume= 2.103 af  
 Outflow = 26.53 cfs @ 12.19 hrs, Volume= 2.010 af, Atten= 0%, Lag= 0.6 min  
 Discarded = 0.06 cfs @ 12.18 hrs, Volume= 0.046 af  
 Primary = 26.47 cfs @ 12.19 hrs, Volume= 1.964 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Peak Elev= 563.19' @ 12.18 hrs Surf.Area= 2,744 sf Storage= 5,026 cf

Plug-Flow detention time= 23.9 min calculated for 1.988 af (95% of inflow)  
 Center-of-Mass det. time= 8.0 min ( 791.3 - 783.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	559.44'	7,541 cf	Northerly Pond from Swale (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
559.44	0	0	0
560.00	431	121	121
562.00	1,819	2,250	2,371
562.79	2,337	1,642	4,012
563.00	2,585	517	4,529
564.00	3,438	3,012	7,541

**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 100-yr Rainfall=7.61"

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Device	Routing	Invert	Outlet Devices
#1	Primary	562.78'	<b>40.0' long x 9.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.46 2.55 2.70 2.69 2.68 2.68 2.67 2.64 2.64 2.64 2.65 2.64 2.65 2.65 2.66 2.67 2.69
#2	Primary	563.30'	<b>40.0' long (Profile 29) Broad-Crested Rectangular Weir</b> Head (feet) 0.49 0.98 1.48 Coef. (English) 3.48 3.50 3.48
#3	Discarded	559.44'	<b>1.020 in/hr Exfiltration over Horizontal area</b>

**Discarded OutFlow** Max=0.06 cfs @ 12.18 hrs HW=563.18' (Free Discharge)↑ **3=Exfiltration** (Exfiltration Controls 0.06 cfs)**Primary OutFlow** Max=25.69 cfs @ 12.19 hrs HW=563.18' (Free Discharge)↑ **1=Broad-Crested Rectangular Weir** (Weir Controls 25.69 cfs @ 1.61 fps)↑ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)**Summary for Pond 2P: Small Det. Pond**

Inflow Area = 1.435 ac, 81.68% Impervious, Inflow Depth > 5.65" for 100-yr event  
 Inflow = 8.40 cfs @ 12.15 hrs, Volume= 0.676 af  
 Outflow = 8.63 cfs @ 12.18 hrs, Volume= 0.676 af, Atten= 0%, Lag= 1.7 min  
 Primary = 6.09 cfs @ 12.16 hrs, Volume= 0.644 af  
 Secondary = 2.55 cfs @ 12.18 hrs, Volume= 0.032 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 579.33' @ 12.16 hrs Surf.Area= 198 sf Storage= 298 cf

Plug-Flow detention time= 0.4 min calculated for 0.676 af (100% of inflow)

Center-of-Mass det. time= 0.3 min ( 778.6 - 778.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	576.21'	457 cf	<b>Small Detention Pond (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
576.21	0	0	0
577.00	56	22	22
578.00	108	82	104
579.00	162	135	239
580.00	273	218	457

Device	Routing	Invert	Outlet Devices
#1	Primary	576.21'	<b>12.0" Round Culvert to Large Pond</b> L= 49.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 576.21' / 575.71' S= 0.0102 ' S= 0.0102 ' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	579.00'	<b>120.0 deg x 5.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir</b> Cv= 2.48 (C= 3.10)



**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 100-yr Rainfall=7.61"

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**Primary OutFlow** Max=5.99 cfs @ 12.16 hrs HW=579.25' TW=563.17' (Dynamic Tailwater)↑**1=Culvert to Large Pond** (Barrel Controls 5.99 cfs @ 7.63 fps)**Secondary OutFlow** Max=2.25 cfs @ 12.18 hrs HW=579.26' TW=563.18' (Dynamic Tailwater)↑**2=Sharp-Crested Vee/Trap Weir** (Weir Controls 2.25 cfs @ 1.56 fps)**Summary for Pond 3P: CB IN MAIN DRIVEWAY TO ABUTTING LOT**

Inflow Area = 1.255 ac, 79.56% Impervious, Inflow Depth > 5.69" for 100-yr event  
 Inflow = 7.52 cfs @ 12.13 hrs, Volume= 0.595 af  
 Outflow = 7.52 cfs @ 12.13 hrs, Volume= 0.595 af, Atten= 0%, Lag= 0.0 min  
 Primary = 7.52 cfs @ 12.13 hrs, Volume= 0.595 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 581.39' @ 12.13 hrs

Flood Elev= 584.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	577.00'	<b>12.0" Round Culvert</b> L= 68.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 577.00' / 571.56' S= 0.0800 ' / Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

**Primary OutFlow** Max=7.14 cfs @ 12.13 hrs HW=581.06' (Free Discharge)↑**1=Culvert** (Inlet Controls 7.14 cfs @ 9.08 fps)**Summary for Pond 8R: DMH with 15" Drainage Pipe**

Inflow Area = 0.394 ac, 94.56% Impervious, Inflow Depth > 5.85" for 100-yr event  
 Inflow = 2.42 cfs @ 12.13 hrs, Volume= 0.192 af  
 Outflow = 2.42 cfs @ 12.13 hrs, Volume= 0.192 af, Atten= 0%, Lag= 0.0 min  
 Primary = 2.42 cfs @ 12.13 hrs, Volume= 0.192 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 582.07' @ 12.24 hrs

Flood Elev= 585.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	580.38'	<b>15.0" Round Culvert</b> L= 95.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 580.38' / 579.36' S= 0.0107 ' / Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=0.00 cfs @ 12.13 hrs HW=581.52' TW=581.85' (Dynamic Tailwater)↑**1=Culvert** ( Controls 0.00 cfs)

**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 100-yr Rainfall=7.61"

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**Summary for Pond 11R: DMH with 15" Drainage Pipe**

Inflow Area = 0.953 ac, 83.94% Impervious, Inflow Depth > 5.71" for 100-yr event  
 Inflow = 5.72 cfs @ 12.13 hrs, Volume= 0.453 af  
 Outflow = 5.72 cfs @ 12.13 hrs, Volume= 0.453 af, Atten= 0%, Lag= 0.0 min  
 Primary = 5.72 cfs @ 12.13 hrs, Volume= 0.453 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 583.36' @ 12.15 hrs

Flood Elev= 586.35'

Device	Routing	Invert	Outlet Devices
#1	Primary	581.06'	<b>15.0" Round Culvert</b> L= 177.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 581.06' / 580.39' S= 0.0038 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=5.17 cfs @ 12.13 hrs HW=583.23' TW=581.85' (Dynamic Tailwater)**1=Culvert** (Outlet Controls 5.17 cfs @ 4.22 fps)**Summary for Pond 12R: DMH 12 OUT TO SMALL POND**

Inflow Area = 1.346 ac, 87.05% Impervious, Inflow Depth > 5.75" for 100-yr event  
 Inflow = 8.14 cfs @ 12.13 hrs, Volume= 0.645 af  
 Outflow = 8.01 cfs @ 12.15 hrs, Volume= 0.645 af, Atten= 2%, Lag= 1.0 min  
 Primary = 8.01 cfs @ 12.15 hrs, Volume= 0.645 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 582.00' @ 12.15 hrs Surf.Area= 25 sf Storage= 387 cf

Flood Elev= 586.31' Surf.Area= 25 sf Storage= 496 cf

Plug-Flow detention time= 1.1 min calculated for 0.639 af (99% of inflow)

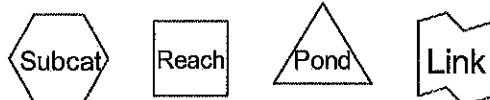
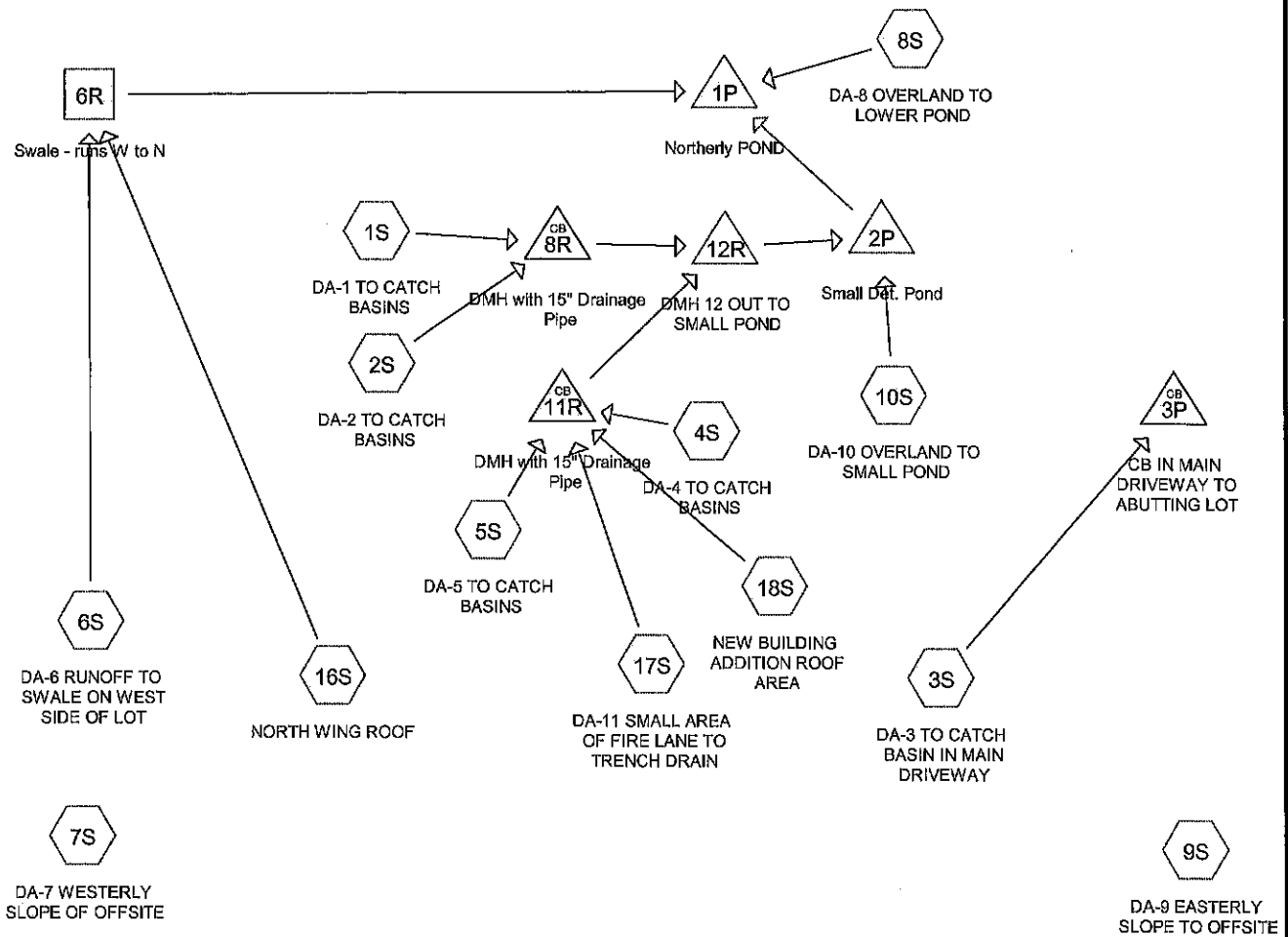
Center-of-Mass det. time= 0.7 min ( 777.6 - 776.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	579.36'	87 cf	<b>4.00'D x 6.95'H Vertical Cone/Cylinder</b>
#2	579.36'	217 cf	<b>15.0" Round Pipe Storage</b> L= 177.0' S= 0.0038 '/'
#3	579.36'	117 cf	<b>15.0" Round Pipe Storage</b> L= 95.0' S= 0.0107 '/'
#4	580.39'	78 cf	<b>4.00'D x 6.23'H Vertical Cone/Cylinder</b>
		499 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	579.36'	<b>15.0" Round Culvert</b> L= 61.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 579.36' / 578.98' S= 0.0062 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=7.61 cfs @ 12.15 hrs HW=581.85' TW=579.24' (Dynamic Tailwater)**1=Culvert** (Barrel Controls 7.61 cfs @ 6.20 fps)

## POSTDEVELOPMENT



**Routing Diagram for 189 MAY ST Fairlawn POSTDEV**  
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**189 MAY ST Fairlawn POSTDEV**

Type III 24-hr 2-yr Rainfall=3.14"

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**Summary for Subcatchment 1S: DA-1 TO CATCH BASINS**

Runoff = 0.42 cfs @ 12.13 hrs, Volume= 0.033 af, Depth&gt; 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

Area (sf)	CN	Description
* 7,195	98	impervious
7,195		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 2S: DA-2 TO CATCH BASINS**

Runoff = 0.55 cfs @ 12.13 hrs, Volume= 0.044 af, Depth&gt; 2.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

Area (sf)	CN	Description
* 9,015	98	impervious
* 932	74	hsgC grass, open
9,947	96	Weighted Average
932		9.37% Pervious Area
9,015		90.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 3S: DA-3 TO CATCH BASIN IN MAIN DRIVEWAY**

Runoff = 2.25 cfs @ 12.14 hrs, Volume= 0.177 af, Depth&gt; 1.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

Area (sf)	CN	Description
* 31,510	98	impervious
* 7,119	74	hsgC grass, open, some mulch
* 6,093	72	hsgC wooded, trees
* 2,258	98	roof
46,980	91	Weighted Average
13,212		28.12% Pervious Area
33,768		71.88% Impervious Area

**189 MAY ST Fairlawn POSTDEV**

Type III 24-hr 2-yr Rainfall=3.14"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 4S: DA-4 TO CATCH BASINS**

Runoff = 0.43 cfs @ 12.14 hrs, Volume= 0.034 af, Depth&gt; 1.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Type III 24-hr 2-yr Rainfall=3.14"

	Area (sf)	CN	Description
*	5,963	98	impervious
*	4,221	74	hsgC grass, open
	10,184	88	Weighted Average
	4,221		41.45% Pervious Area
	5,963		58.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 5S: DA-5 TO CATCH BASINS**

Runoff = 1.73 cfs @ 12.13 hrs, Volume= 0.137 af, Depth&gt; 2.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Type III 24-hr 2-yr Rainfall=3.14"

	Area (sf)	CN	Description
*	28,942	98	impervious
*	1,482	74	hsgC grass, open
	30,424	97	Weighted Average
	1,482		4.87% Pervious Area
	28,942		95.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 6S: DA-6 RUNOFF TO SWALE ON WEST SIDE OF LOT**

Runoff = 4.46 cfs @ 12.15 hrs, Volume= 0.359 af, Depth&gt; 1.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Type III 24-hr 2-yr Rainfall=3.14"

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	Area (sf)	CN	Description
*	43,513	98	impervious
*	74,098	72	hsgC wooded, trees
*	12,925	98	roof
	130,536	83	Weighted Average
	74,098		56.76% Pervious Area
	56,438		43.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 7S: DA-7 WESTERLY SLOPE OF OFFSITE**

Runoff = 0.82 cfs @ 12.15 hrs, Volume= 0.065 af, Depth&gt; 1.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

	Area (sf)	CN	Description
*	9,091	98	impervious
*	13,655	74	hsgC grass, open
	22,746	84	Weighted Average
	13,655		60.03% Pervious Area
	9,091		39.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 8S: DA-8 OVERLAND TO LOWER POND**

Runoff = 0.10 cfs @ 12.13 hrs, Volume= 0.008 af, Depth&gt; 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

	Area (sf)	CN	Description
*	1,702	98	impervious
	1,702		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

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Type III 24-hr 2-yr Rainfall=3.14"

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**Summary for Subcatchment 9S: DA-9 EASTERLY SLOPE TO OFFSITE**

Runoff = 0.63 cfs @ 12.17 hrs, Volume= 0.054 af, Depth&gt; 0.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

	Area (sf)	CN	Description
*	921	98	impervious
*	13,218	74	hsgC grass, open
*	17,194	72	hsgC wooded, trees
	31,333	74	Weighted Average
	30,412		97.06% Pervious Area
	921		2.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 10S: DA-10 OVERLAND TO SMALL POND**

Runoff = 0.08 cfs @ 12.17 hrs, Volume= 0.007 af, Depth&gt; 0.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

	Area (sf)	CN	Description
*	3,852	74	hsgC grass, open
	3,852		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 16S: NORTH WING ROOF**

Runoff = 0.75 cfs @ 12.13 hrs, Volume= 0.059 af, Depth&gt; 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

	Area (sf)	CN	Description
*	12,979	98	roof
	12,979		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

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Type III 24-hr 2-yr Rainfall=3.14"

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**Summary for Subcatchment 17S: DA-11 SMALL AREA OF FIRE LANE TO TRENCH DRAIN**

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.013 af, Depth&gt; 1.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

	Area (sf)	CN	Description
*	2,311	98	impervious pav
*	1,026	74	pervious grass
	3,337	91	Weighted Average
	1,026		30.75% Pervious Area
	2,311		69.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 18S: NEW BUILDING ADDITION ROOF AREA**

Runoff = 0.42 cfs @ 12.13 hrs, Volume= 0.033 af, Depth&gt; 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

	Area (sf)	CN	Description
	7,255	98	Roofs, HSG C
	7,255		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Reach 6R: Swale - runs W to N**

Inflow Area = 3.295 ac, 48.37% Impervious, Inflow Depth > 1.52" for 2-yr event  
 Inflow = 5.21 cfs @ 12.15 hrs, Volume= 0.418 af  
 Outflow = 5.11 cfs @ 12.19 hrs, Volume= 0.417 af, Atten= 2%, Lag= 2.9 min

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Max. Velocity= 3.34 fps, Min. Travel Time= 2.5 min  
 Avg. Velocity= 1.28 fps, Avg. Travel Time= 6.5 min

Peak Storage= 765 cf @ 12.19 hrs  
 Average Depth at Peak Storage= 0.31'  
 Bank-Full Depth= 1.50' Flow Area= 13.3 sf, Capacity= 106.43 cfs



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4.00' x 1.50' deep channel, n= 0.025

Side Slope Z-value= 5.0 1.5 ' Top Width= 13.75'

Length= 500.0' Slope= 0.0200 ' /'

Inlet Invert= 573.00', Outlet Invert= 563.00'

**Summary for Pond 1P: Northerly POND**

Inflow Area = 4.991 ac, 60.62% Impervious, Inflow Depth > 1.74" for 2-yr event  
 Inflow = 8.71 cfs @ 12.20 hrs, Volume= 0.725 af  
 Outflow = 8.83 cfs @ 12.21 hrs, Volume= 0.632 af, Atten= 0%, Lag= 0.7 min  
 Discarded = 0.06 cfs @ 12.21 hrs, Volume= 0.042 af  
 Primary = 8.77 cfs @ 12.21 hrs, Volume= 0.590 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 562.98' @ 12.21 hrs Surf.Area= 2,561 sf Storage= 4,476 cf

Plug-Flow detention time= 55.1 min calculated for 0.626 af (86% of inflow)

Center-of-Mass det. time= 18.5 min ( 811.6 - 793.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	559.44'	7,541 cf	<b>Northerly Pond from Swale (Prismatic) Listed below (Recalc)</b>

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
559.44	0	0	0
560.00	431	121	121
562.00	1,819	2,250	2,371
562.79	2,337	1,642	4,012
563.00	2,585	517	4,529
564.00	3,438	3,012	7,541

Device	Routing	Invert	Outlet Devices
#1	Primary	562.78'	<b>40.0' long x 9.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.46 2.55 2.70 2.69 2.68 2.68 2.67 2.64 2.64 2.64 2.65 2.64 2.65 2.65 2.66 2.67 2.69
#2	Primary	563.30'	<b>40.0' long (Profile 29) Broad-Crested Rectangular Weir</b> Head (feet) 0.49 0.98 1.48 Coef. (English) 3.48 3.50 3.48
#3	Discarded	559.44'	<b>1.020 in/hr Exfiltration over Horizontal area</b>

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**Discarded OutFlow** Max=0.06 cfs @ 12.21 hrs HW=562.98' (Free Discharge)

↑3=Exfiltration (Exfiltration Controls 0.06 cfs)

**Primary OutFlow** Max=8.63 cfs @ 12.21 hrs HW=562.98' (Free Discharge)

↑1=Broad-Crested Rectangular Weir (Weir Controls 8.63 cfs @ 1.09 fps)

↑2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond 2P: Small Det. Pond**

Inflow Area = 1.657 ac, 84.05% Impervious, Inflow Depth > 2.17" for 2-yr event  
 Inflow = 3.52 cfs @ 12.19 hrs, Volume= 0.300 af  
 Outflow = 3.51 cfs @ 12.20 hrs, Volume= 0.300 af, Atten= 0%, Lag= 0.6 min  
 Primary = 3.51 cfs @ 12.20 hrs, Volume= 0.300 af  
 Secondary = 0.00 cfs @ 10.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 577.58' @ 12.20 hrs Surf.Area= 86 sf Storage= 63 cf

Plug-Flow detention time= 0.2 min calculated for 0.300 af (100% of inflow)

Center-of-Mass det. time= 0.2 min ( 781.8 - 781.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	576.21'	457 cf	<b>Small Detention Pond (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
576.21	0	0	0
577.00	56	22	22
578.00	108	82	104
579.00	162	135	239
580.00	273	218	457

Device	Routing	Invert	Outlet Devices
#1	Primary	576.21'	<b>12.0" Round Culvert to Large Pond</b> L= 49.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 576.21' / 575.71' S= 0.0102'/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	579.00'	<b>120.0 deg x 5.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir</b> Cv= 2.48 (C= 3.10)

**Primary OutFlow** Max=3.50 cfs @ 12.20 hrs HW=577.57' TW=562.98' (Dynamic Tailwater)

↑1=Culvert to Large Pond (Barrel Controls 3.50 cfs @ 4.45 fps)

**Secondary OutFlow** Max=0.00 cfs @ 10.00 hrs HW=576.39' TW=559.71' (Dynamic Tailwater)

↑2=Sharp-Crested Vee/Trap Weir ( Controls 0.00 cfs)

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**Summary for Pond 3P: CB IN MAIN DRIVEWAY TO ABUTTING LOT**

Inflow Area = 1.079 ac, 71.88% Impervious, Inflow Depth > 1.97" for 2-yr event  
 Inflow = 2.25 cfs @ 12.14 hrs, Volume= 0.177 af  
 Outflow = 2.25 cfs @ 12.14 hrs, Volume= 0.177 af, Atten= 0%, Lag= 0.0 min  
 Primary = 2.25 cfs @ 12.14 hrs, Volume= 0.177 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 577.85' @ 12.14 hrs

Flood Elev= 584.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	577.00'	<b>12.0" Round Culvert</b> L= 68.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 577.00' / 571.56' S= 0.0800 ' /' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

**Primary OutFlow** Max=2.13 cfs @ 12.14 hrs HW=577.82' (Free Discharge)**1=Culvert** (Inlet Controls 2.13 cfs @ 3.08 fps)**Summary for Pond 8R: DMH with 15" Drainage Pipe**

Inflow Area = 0.394 ac, 94.56% Impervious, Inflow Depth > 2.34" for 2-yr event  
 Inflow = 0.97 cfs @ 12.13 hrs, Volume= 0.077 af  
 Outflow = 0.97 cfs @ 12.13 hrs, Volume= 0.077 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.97 cfs @ 12.13 hrs, Volume= 0.077 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 580.96' @ 12.20 hrs

Flood Elev= 585.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	580.38'	<b>15.0" Round Culvert</b> L= 177.0' Ke= 0.500 Inlet / Outlet Invert= 580.38' / 579.71' S= 0.0038 ' /' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=0.73 cfs @ 12.13 hrs HW=580.93' TW=580.49' (Dynamic Tailwater)**1=Culvert** (Outlet Controls 0.73 cfs @ 2.05 fps)**Summary for Pond 11R: DMH with 15" Drainage Pipe**

Inflow Area = 1.175 ac, 86.86% Impervious, Inflow Depth > 2.22" for 2-yr event  
 Inflow = 2.74 cfs @ 12.14 hrs, Volume= 0.217 af  
 Outflow = 2.74 cfs @ 12.14 hrs, Volume= 0.217 af, Atten= 0%, Lag= 0.0 min  
 Primary = 2.74 cfs @ 12.14 hrs, Volume= 0.217 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 581.90' @ 12.14 hrs

Flood Elev= 586.35'

Device	Routing	Invert	Outlet Devices
#1	Primary	581.06'	<b>15.0" Round Culvert</b> L= 95.0' CPP, square edge headwall, Ke= 0.500

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Inlet / Outlet Invert= 581.06' / 580.04' S= 0.0107 ' /' Cc= 0.900  
 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=2.60 cfs @ 12.14 hrs HW=581.87' TW=580.50' (Dynamic Tailwater)

1=Culvert (Inlet Controls 2.60 cfs @ 3.07 fps)

**Summary for Pond 12R: DMH 12 OUT TO SMALL POND**

Inflow Area = 1.569 ac, 88.79% Impervious, Inflow Depth > 2.25" for 2-yr event  
 Inflow = 3.71 cfs @ 12.13 hrs, Volume= 0.294 af  
 Outflow = 3.45 cfs @ 12.19 hrs, Volume= 0.294 af, Atten= 7%, Lag= 3.5 min  
 Primary = 3.45 cfs @ 12.19 hrs, Volume= 0.294 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 580.61' @ 12.19 hrs Surf.Area= 777 sf Storage= 362 cf

Flood Elev= 586.31' Surf.Area= 502 sf Storage= 2,130 cf

Plug-Flow detention time= 1.4 min calculated for 0.293 af (100% of inflow)

Center-of-Mass det. time= 0.9 min ( 780.7 - 779.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	579.36'	87 cf	4.00'D x 6.95'H Vertical Cone/Cylinder
#2	579.36'	459 cf	36.0" Round Pipe Storage L= 65.0' S= 0.0038 ' /'
#3	579.36'	117 cf	15.0" Round Pipe Storage L= 95.0' S= 0.0107 ' /'
#4	580.39'	78 cf	4.00'D x 6.23'H Vertical Cone/Cylinder
#5	580.00'	507 cf	4.00'W x 116.00'L x 4.50'H Prismatic 2,088 cf Overall - 820 cf Embedded = 1,268 cf x 40.0% Voids
#6	580.50'	820 cf	36.0" Round Pipe Storage Inside #5 L= 116.0' S= 0.0050 ' /'
#7	581.06'	65 cf	4.00'D x 5.19'H Vertical Cone/Cylinder
		2,134 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	579.36'	15.0" Round Culvert L= 61.0' Ke= 0.500 Inlet / Outlet Invert= 579.36' / 578.98' S= 0.0062 ' /' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	579.36'	13.2" Vert. Orifice/Grate C= 0.600
#3	Device 2	579.35'	12.3" Vert. Orifice/Grate C= 0.600
#4	Device 2	581.40'	10.0" Vert. Orifice/Grate C= 0.600
#5	Device 2	582.00'	4.0' long x 2.50' rise Sharp-Crested Rectangular Weir 2 End Contraction(s) 3.0' Crest Height

**Primary OutFlow** Max=3.41 cfs @ 12.19 hrs HW=580.60' TW=577.56' (Dynamic Tailwater)

1=Culvert (Passes 3.41 cfs of 4.17 cfs potential flow)

2=Orifice/Grate (Passes 3.41 cfs of 3.80 cfs potential flow)

3=Orifice/Grate (Orifice Controls 3.41 cfs @ 4.13 fps)

4=Orifice/Grate ( Controls 0.00 cfs)

5=Sharp-Crested Rectangular Weir ( Controls 0.00 cfs)

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Type III 24-hr 10-yr Rainfall=4.87"

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**Summary for Subcatchment 1S: DA-1 TO CATCH BASINS**

Runoff = 0.65 cfs @ 12.13 hrs, Volume= 0.052 af, Depth&gt; 3.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

Area (sf)	CN	Description
* 7,195	98	impervious
7,195		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 2S: DA-2 TO CATCH BASINS**

Runoff = 0.88 cfs @ 12.13 hrs, Volume= 0.070 af, Depth&gt; 3.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

Area (sf)	CN	Description
* 9,015	98	impervious
* 932	74	hsgC grass, open
9,947	96	Weighted Average
932		9.37% Pervious Area
9,015		90.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 3S: DA-3 TO CATCH BASIN IN MAIN DRIVEWAY**

Runoff = 3.85 cfs @ 12.14 hrs, Volume= 0.303 af, Depth&gt; 3.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

Area (sf)	CN	Description
* 31,510	98	impervious
* 7,119	74	hsgC grass, open, some mulch
* 6,093	72	hsgC wooded, trees
* 2,258	98	roof
46,980	91	Weighted Average
13,212		28.12% Pervious Area
33,768		71.88% Impervious Area

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Type III 24-hr 10-yr Rainfall=4.87"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 4S: DA-4 TO CATCH BASINS**

Runoff = 0.78 cfs @ 12.14 hrs, Volume= 0.062 af, Depth&gt; 3.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Type III 24-hr 10-yr Rainfall=4.87"

Area (sf)	CN	Description
* 5,963	98	impervious
* 4,221	74	hsgC grass, open
10,184	88	Weighted Average
4,221		41.45% Pervious Area
5,963		58.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 5S: DA-5 TO CATCH BASINS**

Runoff = 2.73 cfs @ 12.13 hrs, Volume= 0.216 af, Depth&gt; 3.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Type III 24-hr 10-yr Rainfall=4.87"

Area (sf)	CN	Description
* 28,942	98	impervious
* 1,482	74	hsgC grass, open
30,424	97	Weighted Average
1,482		4.87% Pervious Area
28,942		95.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 6S: DA-6 RUNOFF TO SWALE ON WEST SIDE OF LOT**

Runoff = 8.76 cfs @ 12.14 hrs, Volume= 0.694 af, Depth&gt; 2.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Type III 24-hr 10-yr Rainfall=4.87"

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Type III 24-hr 10-yr Rainfall=4.87"

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	Area (sf)	CN	Description
*	43,513	98	impervious
*	74,098	72	hsgC wooded, trees
*	12,925	98	roof
	130,536	83	Weighted Average
	74,098		56.76% Pervious Area
	56,438		43.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 7S: DA-7 WESTERLY SLOPE OF OFFSITE**

Runoff = 1.57 cfs @ 12.14 hrs, Volume= 0.124 af, Depth&gt; 2.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

	Area (sf)	CN	Description
*	9,091	98	impervious
*	13,655	74	hsgC grass, open
	22,746	84	Weighted Average
	13,655		60.03% Pervious Area
	9,091		39.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 8S: DA-8 OVERLAND TO LOWER POND**

Runoff = 0.15 cfs @ 12.13 hrs, Volume= 0.012 af, Depth&gt; 3.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

	Area (sf)	CN	Description
*	1,702	98	impervious
	1,702		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

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Type III 24-hr 10-yr Rainfall=4.87"

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**Summary for Subcatchment 9S: DA-9 EASTERLY SLOPE TO OFFSITE**

Runoff = 1.54 cfs @ 12.15 hrs, Volume= 0.125 af, Depth&gt; 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

	Area (sf)	CN	Description
*	921	98	impervious
*	13,218	74	hsgC grass, open
*	17,194	72	hsgC wooded, trees
	31,333	74	Weighted Average
	30,412		97.06% Pervious Area
	921		2.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 10S: DA-10 OVERLAND TO SMALL POND**

Runoff = 0.19 cfs @ 12.15 hrs, Volume= 0.015 af, Depth&gt; 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

	Area (sf)	CN	Description
*	3,852	74	hsgC grass, open
	3,852		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 16S: NORTH WING ROOF**

Runoff = 1.17 cfs @ 12.13 hrs, Volume= 0.093 af, Depth&gt; 3.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

	Area (sf)	CN	Description
*	12,979	98	roof
	12,979		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,



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Type III 24-hr 10-yr Rainfall=4.87"

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**Summary for Subcatchment 17S: DA-11 SMALL AREA OF FIRE LANE TO TRENCH DRAIN**

Runoff = 0.27 cfs @ 12.14 hrs, Volume= 0.022 af, Depth&gt; 3.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

	Area (sf)	CN	Description
*	2,311	98	impervious pav
*	1,026	74	pervious grass
	3,337	91	Weighted Average
	1,026		30.75% Pervious Area
	2,311		69.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 18S: NEW BUILDING ADDITION ROOF AREA**

Runoff = 0.66 cfs @ 12.13 hrs, Volume= 0.052 af, Depth&gt; 3.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

	Area (sf)	CN	Description
	7,255	98	Roofs, HSG C
	7,255		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Reach 6R: Swale - runs W to N**

Inflow Area = 3.295 ac, 48.37% Impervious, Inflow Depth > 2.87" for 10-yr event  
 Inflow = 9.93 cfs @ 12.14 hrs, Volume= 0.787 af  
 Outflow = 9.75 cfs @ 12.18 hrs, Volume= 0.784 af, Atten= 2%, Lag= 2.6 min

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Max. Velocity= 4.08 fps, Min. Travel Time= 2.0 min  
 Avg. Velocity= 1.60 fps, Avg. Travel Time= 5.2 min

Peak Storage= 1,193 cf @ 12.18 hrs  
 Average Depth at Peak Storage= 0.44'  
 Bank-Full Depth= 1.50' Flow Area= 13.3 sf, Capacity= 106.43 cfs

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4.00' x 1.50' deep channel, n= 0.025

Side Slope Z-value= 5.0 1.5 ' Top Width= 13.75'

Length= 500.0' Slope= 0.0200 ' /'

Inlet Invert= 573.00', Outlet Invert= 563.00'

**Summary for Pond 1P: Northerly POND**

Inflow Area = 4.991 ac, 60.62% Impervious, Inflow Depth > 3.09" for 10-yr event  
 Inflow = 15.09 cfs @ 12.20 hrs, Volume= 1.285 af  
 Outflow = 15.15 cfs @ 12.20 hrs, Volume= 1.192 af, Atten= 0%, Lag= 0.6 min  
 Discarded = 0.06 cfs @ 12.20 hrs, Volume= 0.044 af  
 Primary = 15.09 cfs @ 12.20 hrs, Volume= 1.148 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 563.06' @ 12.20 hrs Surf.Area= 2,639 sf Storage= 4,695 cf

Plug-Flow detention time= 35.5 min calculated for 1.179 af (92% of inflow)

Center-of-Mass det. time= 12.0 min ( 799.8 - 787.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	559.44'	7,541 cf	<b>Northerly Pond from Swale (Prismatic) Listed below (Recalc)</b>

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
559.44	0	0	0
560.00	431	121	121
562.00	1,819	2,250	2,371
562.79	2,337	1,642	4,012
563.00	2,585	517	4,529
564.00	3,438	3,012	7,541

Device	Routing	Invert	Outlet Devices
#1	Primary	562.78'	<b>40.0' long x 9.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.46 2.55 2.70 2.69 2.68 2.68 2.67 2.64 2.64 2.64 2.65 2.64 2.65 2.65 2.66 2.67 2.69
#2	Primary	563.30'	<b>40.0' long (Profile 29) Broad-Crested Rectangular Weir</b> Head (feet) 0.49 0.98 1.48 Coef. (English) 3.48 3.50 3.48
#3	Discarded	559.44'	<b>1.020 in/hr Exfiltration over Horizontal area</b>

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**Discarded OutFlow** Max=0.06 cfs @ 12.20 hrs HW=563.06' (Free Discharge)

↑3=Exfiltration (Exfiltration Controls 0.06 cfs)

**Primary OutFlow** Max=14.96 cfs @ 12.20 hrs HW=563.06' (Free Discharge)

↑1=Broad-Crested Rectangular Weir (Weir Controls 14.96 cfs @ 1.33 fps)

↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

**Summary for Pond 2P: Small Det. Pond**

Inflow Area = 1.657 ac, 84.05% Impervious, Inflow Depth > 3.53" for 10-yr event  
 Inflow = 5.43 cfs @ 12.21 hrs, Volume= 0.488 af  
 Outflow = 5.32 cfs @ 12.24 hrs, Volume= 0.488 af, Atten= 2%, Lag= 1.6 min  
 Primary = 5.32 cfs @ 12.24 hrs, Volume= 0.488 af  
 Secondary = 0.00 cfs @ 10.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 578.70' @ 12.24 hrs Surf.Area= 146 sf Storage= 193 cf

Plug-Flow detention time= 0.3 min calculated for 0.483 af (99% of inflow)

Center-of-Mass det. time= 0.2 min ( 780.2 - 780.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	576.21'	457 cf	<b>Small Detention Pond (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
576.21	0	0	0
577.00	56	22	22
578.00	108	82	104
579.00	162	135	239
580.00	273	218	457

Device	Routing	Invert	Outlet Devices
#1	Primary	576.21'	<b>12.0" Round Culvert to Large Pond</b> L= 49.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 576.21' / 575.71' S= 0.0102 ' S= 0.0102 ' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	579.00'	<b>120.0 deg x 5.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir</b> Cv= 2.48 (C= 3.10)

**Primary OutFlow** Max=5.19 cfs @ 12.24 hrs HW=578.62' TW=563.05' (Dynamic Tailwater)

↑1=Culvert to Large Pond (Barrel Controls 5.19 cfs @ 6.61 fps)

**Secondary OutFlow** Max=0.00 cfs @ 10.00 hrs HW=576.45' TW=559.81' (Dynamic Tailwater)

↑2=Sharp-Crested Vee/Trap Weir (Controls 0.00 cfs)

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**Summary for Pond 3P: CB IN MAIN DRIVEWAY TO ABUTTING LOT**

Inflow Area = 1.079 ac, 71.88% Impervious, Inflow Depth > 3.37" for 10-yr event  
 Inflow = 3.85 cfs @ 12.14 hrs, Volume= 0.303 af  
 Outflow = 3.85 cfs @ 12.14 hrs, Volume= 0.303 af, Atten= 0%, Lag= 0.0 min  
 Primary = 3.85 cfs @ 12.14 hrs, Volume= 0.303 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 578.52' @ 12.13 hrs

Flood Elev= 584.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	577.00'	<b>12.0" Round Culvert</b> L= 68.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 577.00' / 571.56' S= 0.0800 ' S= 0.0800 ' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

**Primary OutFlow** Max=3.64 cfs @ 12.14 hrs HW=578.43' (Free Discharge)**1=Culvert** (Inlet Controls 3.64 cfs @ 4.64 fps)**Summary for Pond 8R: DMH with 15" Drainage Pipe**

Inflow Area = 0.394 ac, 94.56% Impervious, Inflow Depth > 3.70" for 10-yr event  
 Inflow = 1.53 cfs @ 12.13 hrs, Volume= 0.121 af  
 Outflow = 1.53 cfs @ 12.13 hrs, Volume= 0.121 af, Atten= 0%, Lag= 0.0 min  
 Primary = 1.53 cfs @ 12.13 hrs, Volume= 0.121 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 581.61' @ 12.30 hrs

Flood Elev= 585.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	580.38'	<b>15.0" Round Culvert</b> L= 177.0' Ke= 0.500 Inlet / Outlet Invert= 580.38' / 579.71' S= 0.0038 ' S= 0.0038 ' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=0.00 cfs @ 12.13 hrs HW=581.19' TW=581.24' (Dynamic Tailwater)**1=Culvert** ( Controls 0.00 cfs)**Summary for Pond 11R: DMH with 15" Drainage Pipe**

Inflow Area = 1.175 ac, 86.86% Impervious, Inflow Depth > 3.59" for 10-yr event  
 Inflow = 4.44 cfs @ 12.13 hrs, Volume= 0.351 af  
 Outflow = 4.44 cfs @ 12.13 hrs, Volume= 0.351 af, Atten= 0%, Lag= 0.0 min  
 Primary = 4.44 cfs @ 12.13 hrs, Volume= 0.351 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 582.23' @ 12.13 hrs

Flood Elev= 586.35'

Device	Routing	Invert	Outlet Devices
#1	Primary	581.06'	<b>15.0" Round Culvert</b> L= 95.0' CPP, square edge headwall, Ke= 0.500

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Inlet / Outlet Invert= 581.06' / 580.04' S= 0.0107 ' S= 0.0107 ' Cc= 0.900  
 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=3.96 cfs @ 12.13 hrs HW=582.19' TW=581.24' (Dynamic Tailwater)

1=Culvert (Outlet Controls 3.96 cfs @ 4.49 fps)

**Summary for Pond 12R: DMH 12 OUT TO SMALL POND**

Inflow Area = 1.569 ac, 88.79% Impervious, Inflow Depth > 3.62" for 10-yr event  
 Inflow = 5.97 cfs @ 12.13 hrs, Volume= 0.473 af  
 Outflow = 5.26 cfs @ 12.21 hrs, Volume= 0.473 af, Atten= 12%, Lag= 4.6 min  
 Primary = 5.26 cfs @ 12.21 hrs, Volume= 0.473 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 581.55' @ 12.21 hrs Surf.Area= 684 sf Storage= 891 cf

Flood Elev= 586.31' Surf.Area= 502 sf Storage= 2,130 cf

Plug-Flow detention time= 1.7 min calculated for 0.472 af (100% of inflow)

Center-of-Mass det. time= 1.3 min ( 779.2 - 777.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	579.36'	87 cf	4.00'D x 6.95'H Vertical Cone/Cylinder
#2	579.36'	459 cf	36.0" Round Pipe Storage L= 65.0' S= 0.0038 ' S= 0.0038 ' S= 0.0038 '
#3	579.36'	117 cf	15.0" Round Pipe Storage L= 95.0' S= 0.0107 ' S= 0.0107 ' S= 0.0107 '
#4	580.39'	78 cf	4.00'D x 6.23'H Vertical Cone/Cylinder
#5	580.00'	507 cf	4.00'W x 116.00'L x 4.50'H Prismatic 2,088 cf Overall - 820 cf Embedded = 1,268 cf x 40.0% Voids
#6	580.50'	820 cf	36.0" Round Pipe Storage Inside #5 L= 116.0' S= 0.0050 ' S= 0.0050 ' S= 0.0050 '
#7	581.06'	65 cf	4.00'D x 5.19'H Vertical Cone/Cylinder
		2,134 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	579.36'	15.0" Round Culvert L= 61.0' Ke= 0.500 Inlet / Outlet Invert= 579.36' / 578.98' S= 0.0062 ' S= 0.0062 ' S= 0.0062 ' n= 0.012, Flow Area= 1.23 sf
#2	Device 1	579.36'	13.2" Vert. Orifice/Grate C= 0.600
#3	Device 2	579.35'	12.3" Vert. Orifice/Grate C= 0.600
#4	Device 2	581.40'	10.0" Vert. Orifice/Grate C= 0.600
#5	Device 2	582.00'	4.0' long x 2.50' rise Sharp-Crested Rectangular Weir 2 End Contraction(s) 3.0' Crest Height

**Primary OutFlow** Max=5.17 cfs @ 12.21 hrs HW=581.52' TW=578.64' (Dynamic Tailwater)

1=Culvert (Passes 5.17 cfs of 6.79 cfs potential flow)

2=Orifice/Grate (Passes 5.17 cfs of 5.80 cfs potential flow)

3=Orifice/Grate (Orifice Controls 5.11 cfs @ 6.19 fps)

4=Orifice/Grate (Orifice Controls 0.05 cfs @ 1.17 fps)

5=Sharp-Crested Rectangular Weir ( Controls 0.00 cfs)

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**Summary for Subcatchment 1S: DA-1 TO CATCH BASINS**

Runoff = 0.80 cfs @ 12.13 hrs, Volume= 0.063 af, Depth&gt; 4.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

Area (sf)	CN	Description
* 7,195	98	impervious
7,195		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 2S: DA-2 TO CATCH BASINS**

Runoff = 1.09 cfs @ 12.13 hrs, Volume= 0.086 af, Depth&gt; 4.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

Area (sf)	CN	Description
* 9,015	98	impervious
* 932	74	hsgC grass, open
9,947	96	Weighted Average
932		9.37% Pervious Area
9,015		90.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 3S: DA-3 TO CATCH BASIN IN MAIN DRIVEWAY**

Runoff = 4.84 cfs @ 12.14 hrs, Volume= 0.381 af, Depth&gt; 4.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

Area (sf)	CN	Description
* 31,510	98	impervious
* 7,119	74	hsgC grass, open, some mulch
* 6,093	72	hsgC wooded, trees
* 2,258	98	roof
46,980	91	Weighted Average
13,212		28.12% Pervious Area
33,768		71.88% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 4S: DA-4 TO CATCH BASINS**

Runoff = 1.00 cfs @ 12.14 hrs, Volume= 0.079 af, Depth&gt; 4.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Type III 24-hr 25-yr Rainfall=5.95"

Area (sf)	CN	Description
* 5,963	98	impervious
* 4,221	74	hsgC grass, open
10,184	88	Weighted Average
4,221		41.45% Pervious Area
5,963		58.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 5S: DA-5 TO CATCH BASINS**

Runoff = 3.35 cfs @ 12.13 hrs, Volume= 0.266 af, Depth&gt; 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Type III 24-hr 25-yr Rainfall=5.95"

Area (sf)	CN	Description
* 28,942	98	impervious
* 1,482	74	hsgC grass, open
30,424	97	Weighted Average
1,482		4.87% Pervious Area
28,942		95.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 6S: DA-6 RUNOFF TO SWALE ON WEST SIDE OF LOT**

Runoff = 11.53 cfs @ 12.14 hrs, Volume= 0.909 af, Depth&gt; 3.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Type III 24-hr 25-yr Rainfall=5.95"

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Type III 24-hr 25-yr Rainfall=5.95"

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	Area (sf)	CN	Description
*	43,513	98	impervious
*	74,098	72	hsgC wooded, trees
*	12,925	98	roof
	130,536	83	Weighted Average
	74,098		56.76% Pervious Area
	56,438		43.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 7S: DA-7 WESTERLY SLOPE OF OFFSITE**

Runoff = 2.05 cfs @ 12.14 hrs, Volume= 0.162 af, Depth&gt; 3.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

	Area (sf)	CN	Description
*	9,091	98	impervious
*	13,655	74	hsgC grass, open
	22,746	84	Weighted Average
	13,655		60.03% Pervious Area
	9,091		39.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 8S: DA-8 OVERLAND TO LOWER POND**

Runoff = 0.19 cfs @ 12.13 hrs, Volume= 0.015 af, Depth&gt; 4.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

	Area (sf)	CN	Description
*	1,702	98	impervious
	1,702		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,



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Type III 24-hr 25-yr Rainfall=5.95"

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**Summary for Subcatchment 9S: DA-9 EASTERLY SLOPE TO OFFSITE**

Runoff = 2.16 cfs @ 12.15 hrs, Volume= 0.173 af, Depth&gt; 2.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

	Area (sf)	CN	Description
*	921	98	impervious
*	13,218	74	hsgC grass, open
*	17,194	72	hsgC wooded, trees
	31,333	74	Weighted Average
	30,412		97.06% Pervious Area
	921		2.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 10S: DA-10 OVERLAND TO SMALL POND**

Runoff = 0.27 cfs @ 12.15 hrs, Volume= 0.021 af, Depth&gt; 2.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

	Area (sf)	CN	Description
*	3,852	74	hsgC grass, open
	3,852		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 16S: NORTH WING ROOF**

Runoff = 1.43 cfs @ 12.13 hrs, Volume= 0.114 af, Depth&gt; 4.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

	Area (sf)	CN	Description
*	12,979	98	roof
	12,979		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

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Type III 24-hr 25-yr Rainfall=5.95"

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**Summary for Subcatchment 17S: DA-11 SMALL AREA OF FIRE LANE TO TRENCH DRAIN**

Runoff = 0.34 cfs @ 12.14 hrs, Volume= 0.027 af, Depth&gt; 4.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

	Area (sf)	CN	Description
*	2,311	98	impervious pav
*	1,026	74	pervious grass
	3,337	91	Weighted Average
	1,026		30.75% Pervious Area
	2,311		69.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 18S: NEW BUILDING ADDITION ROOF AREA**

Runoff = 0.80 cfs @ 12.13 hrs, Volume= 0.064 af, Depth&gt; 4.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

	Area (sf)	CN	Description
	7,255	98	Roofs, HSG C
	7,255		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Reach 6R: Swale - runs W to N**

Inflow Area = 3.295 ac, 48.37% Impervious, Inflow Depth &gt; 3.73" for 25-yr event

Inflow = 12.96 cfs @ 12.14 hrs, Volume= 1.023 af

Outflow = 12.71 cfs @ 12.18 hrs, Volume= 1.021 af, Atten= 2%, Lag= 2.5 min

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Max. Velocity= 4.42 fps, Min. Travel Time= 1.9 min

Avg. Velocity= 1.76 fps, Avg. Travel Time= 4.7 min

Peak Storage= 1,435 cf @ 12.18 hrs

Average Depth at Peak Storage= 0.51'

Bank-Full Depth= 1.50' Flow Area= 13.3 sf, Capacity= 106.43 cfs

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4.00' x 1.50' deep channel, n= 0.025

Side Slope Z-value= 5.0 1.5 ' ' Top Width= 13.75'

Length= 500.0' Slope= 0.0200 ' '

Inlet Invert= 573.00', Outlet Invert= 563.00'

**Summary for Pond 1P: Northerly POND**

Inflow Area = 4.991 ac, 60.62% Impervious, Inflow Depth > 3.95" for 25-yr event  
 Inflow = 19.68 cfs @ 12.19 hrs, Volume= 1.641 af  
 Outflow = 19.67 cfs @ 12.20 hrs, Volume= 1.548 af, Atten= 0%, Lag= 0.5 min  
 Discarded = 0.06 cfs @ 12.20 hrs, Volume= 0.045 af  
 Primary = 19.61 cfs @ 12.20 hrs, Volume= 1.503 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 563.12' @ 12.20 hrs Surf.Area= 2,684 sf Storage= 4,834 cf

Plug-Flow detention time= 30.4 min calculated for 1.547 af (94% of inflow)

Center-of-Mass det. time= 9.9 min ( 795.7 - 785.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	559.44'	7,541 cf	<b>Northerly Pond from Swale (Prismatic) Listed below (Recalc)</b>

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
559.44	0	0	0
560.00	431	121	121
562.00	1,819	2,250	2,371
562.79	2,337	1,642	4,012
563.00	2,585	517	4,529
564.00	3,438	3,012	7,541

Device	Routing	Invert	Outlet Devices
#1	Primary	562.78'	<b>40.0' long x 9.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.46 2.55 2.70 2.69 2.68 2.68 2.67 2.64 2.64 2.64 2.65 2.64 2.65 2.65 2.66 2.67 2.69
#2	Primary	563.30'	<b>40.0' long (Profile 29) Broad-Crested Rectangular Weir</b> Head (feet) 0.49 0.98 1.48 Coef. (English) 3.48 3.50 3.48
#3	Discarded	559.44'	<b>1.020 in/hr Exfiltration over Horizontal area</b>

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**Discarded OutFlow** Max=0.06 cfs @ 12.20 hrs HW=563.11' (Free Discharge)

↑3=Exfiltration (Exfiltration Controls 0.06 cfs)

**Primary OutFlow** Max=19.53 cfs @ 12.20 hrs HW=563.11' (Free Discharge)

↑1=Broad-Crested Rectangular Weir (Weir Controls 19.53 cfs @ 1.46 fps)

↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

**Summary for Pond 2P: Small Det. Pond**

Inflow Area = 1.657 ac, 84.05% Impervious, Inflow Depth > 4.38" for 25-yr event  
 Inflow = 7.02 cfs @ 12.21 hrs, Volume= 0.605 af  
 Outflow = 6.93 cfs @ 12.22 hrs, Volume= 0.605 af, Atten= 1%, Lag= 0.7 min  
 Primary = 5.95 cfs @ 12.24 hrs, Volume= 0.595 af  
 Secondary = 1.01 cfs @ 12.21 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 579.21' @ 12.24 hrs Surf.Area= 185 sf Storage= 276 cf

Plug-Flow detention time= 0.4 min calculated for 0.605 af (100% of inflow)

Center-of-Mass det. time= 0.3 min ( 779.7 - 779.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	576.21'	457 cf	<b>Small Detention Pond (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
576.21	0	0	0
577.00	56	22	22
578.00	108	82	104
579.00	162	135	239
580.00	273	218	457

Device	Routing	Invert	Outlet Devices
#1	Primary	576.21'	<b>12.0" Round Culvert to Large Pond</b> L= 49.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 576.21' / 575.71' S= 0.0102 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	579.00'	<b>120.0 deg x 5.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir</b> Cv= 2.48 (C= 3.10)

**Primary OutFlow** Max=5.84 cfs @ 12.24 hrs HW=579.12' TW=563.10' (Dynamic Tailwater)

↑1=Culvert to Large Pond (Barrel Controls 5.84 cfs @ 7.43 fps)

**Secondary OutFlow** Max=0.93 cfs @ 12.21 hrs HW=579.15' TW=563.11' (Dynamic Tailwater)

↑2=Sharp-Crested Vee/Trap Weir (Weir Controls 0.93 cfs @ 1.19 fps)

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Type III 24-hr 25-yr Rainfall=5.95"

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**Summary for Pond 3P: CB IN MAIN DRIVEWAY TO ABUTTING LOT**

Inflow Area = 1.079 ac, 71.88% Impervious, Inflow Depth > 4.24" for 25-yr event  
 Inflow = 4.84 cfs @ 12.14 hrs, Volume= 0.381 af  
 Outflow = 4.84 cfs @ 12.14 hrs, Volume= 0.381 af, Atten= 0%, Lag= 0.0 min  
 Primary = 4.84 cfs @ 12.14 hrs, Volume= 0.381 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 579.11' @ 12.13 hrs

Flood Elev= 584.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	577.00'	<b>12.0" Round Culvert</b> L= 68.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 577.00' / 571.56' S= 0.0800 '/ Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

**Primary OutFlow** Max=4.58 cfs @ 12.14 hrs HW=578.97' (Free Discharge)**1=Culvert** (Inlet Controls 4.58 cfs @ 5.84 fps)**Summary for Pond 8R: DMH with 15" Drainage Pipe**

Inflow Area = 0.394 ac, 94.56% Impervious, Inflow Depth > 4.55" for 25-yr event  
 Inflow = 1.88 cfs @ 12.13 hrs, Volume= 0.149 af  
 Outflow = 1.88 cfs @ 12.13 hrs, Volume= 0.149 af, Atten= 0%, Lag= 0.0 min  
 Primary = 1.88 cfs @ 12.13 hrs, Volume= 0.149 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 582.16' @ 12.30 hrs

Flood Elev= 585.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	580.38'	<b>15.0" Round Culvert</b> L= 177.0' Ke= 0.500 Inlet / Outlet Invert= 580.38' / 579.71' S= 0.0038 '/ Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=0.00 cfs @ 12.13 hrs HW=581.41' TW=581.72' (Dynamic Tailwater)**1=Culvert** (Controls 0.00 cfs)**Summary for Pond 11R: DMH with 15" Drainage Pipe**

Inflow Area = 1.175 ac, 86.86% Impervious, Inflow Depth > 4.44" for 25-yr event  
 Inflow = 5.49 cfs @ 12.13 hrs, Volume= 0.435 af  
 Outflow = 5.49 cfs @ 12.13 hrs, Volume= 0.435 af, Atten= 0%, Lag= 0.0 min  
 Primary = 5.49 cfs @ 12.13 hrs, Volume= 0.435 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 582.50' @ 12.10 hrs

Flood Elev= 586.35'

Device	Routing	Invert	Outlet Devices
#1	Primary	581.06'	<b>15.0" Round Culvert</b> L= 95.0' CPP, square edge headwall, Ke= 0.500

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Inlet / Outlet Invert= 581.06' / 580.04' S= 0.0107 ' S= 0.900  
n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=4.56 cfs @ 12.13 hrs HW=582.49' TW=581.72' (Dynamic Tailwater)  
 1=Culvert (Outlet Controls 4.56 cfs @ 4.08 fps)

**Summary for Pond 12R: DMH 12 OUT TO SMALL POND**

Inflow Area = 1.569 ac, 88.79% Impervious, Inflow Depth > 4.47" for 25-yr event  
 Inflow = 7.37 cfs @ 12.13 hrs, Volume= 0.584 af  
 Outflow = 6.78 cfs @ 12.21 hrs, Volume= 0.584 af, Atten= 8%, Lag= 4.5 min  
 Primary = 6.78 cfs @ 12.21 hrs, Volume= 0.584 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Peak Elev= 582.10' @ 12.21 hrs Surf.Area= 631 sf Storage= 1,207 cf  
 Flood Elev= 586.31' Surf.Area= 502 sf Storage= 2,130 cf

Plug-Flow detention time= 1.9 min calculated for 0.584 af (100% of inflow)  
 Center-of-Mass det. time= 1.5 min ( 778.7 - 777.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	579.36'	87 cf	4.00'D x 6.95'H Vertical Cone/Cylinder
#2	579.36'	459 cf	36.0" Round Pipe Storage L= 65.0' S= 0.0038 ' S= 0.900
#3	579.36'	117 cf	15.0" Round Pipe Storage L= 95.0' S= 0.0107 ' S= 0.900
#4	580.39'	78 cf	4.00'D x 6.23'H Vertical Cone/Cylinder
#5	580.00'	507 cf	4.00'W x 116.00'L x 4.50'H Prismatic 2,088 cf Overall - 820 cf Embedded = 1,268 cf x 40.0% Voids
#6	580.50'	820 cf	36.0" Round Pipe Storage Inside #5 L= 116.0' S= 0.0050 ' S= 0.900
#7	581.06'	65 cf	4.00'D x 5.19'H Vertical Cone/Cylinder
		2,134 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	579.36'	15.0" Round Culvert L= 61.0' Ke= 0.500 Inlet / Outlet Invert= 579.36' / 578.98' S= 0.0062 ' S= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	579.36'	13.2" Vert. Orifice/Grate C= 0.600
#3	Device 2	579.35'	12.3" Vert. Orifice/Grate C= 0.600
#4	Device 2	581.40'	10.0" Vert. Orifice/Grate C= 0.600
#5	Device 2	582.00'	4.0' long x 2.50' rise Sharp-Crested Rectangular Weir 2 End Contraction(s) 3.0' Crest Height

**Primary OutFlow** Max=6.71 cfs @ 12.21 hrs HW=582.06' TW=579.15' (Dynamic Tailwater)  
 1=Culvert (Passes 6.71 cfs of 8.10 cfs potential flow)  
 2=Orifice/Grate (Orifice Controls 6.71 cfs @ 7.06 fps)  
 3=Orifice/Grate (Passes < 5.89 cfs potential flow)  
 4=Orifice/Grate (Passes < 1.29 cfs potential flow)  
 5=Sharp-Crested Rectangular Weir (Passes < 0.20 cfs potential flow)

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Type III 24-hr 100-yr Rainfall=7.61"

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**Summary for Subcatchment 1S: DA-1 TO CATCH BASINS**

Runoff = 1.02 cfs @ 12.13 hrs, Volume= 0.081 af, Depth&gt; 5.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

Area (sf)	CN	Description
* 7,195	98	impervious
7,195		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 2S: DA-2 TO CATCH BASINS**

Runoff = 1.40 cfs @ 12.13 hrs, Volume= 0.111 af, Depth&gt; 5.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

Area (sf)	CN	Description
* 9,015	98	impervious
* 932	74	hsgC grass, open
9,947	96	Weighted Average
932		9.37% Pervious Area
9,015		90.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 3S: DA-3 TO CATCH BASIN IN MAIN DRIVEWAY**

Runoff = 6.34 cfs @ 12.13 hrs, Volume= 0.501 af, Depth&gt; 5.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

Area (sf)	CN	Description
* 31,510	98	impervious
* 7,119	74	hsgC grass, open, some mulch
* 6,093	72	hsgC wooded, trees
* 2,258	98	roof
46,980	91	Weighted Average
13,212		28.12% Pervious Area
33,768		71.88% Impervious Area

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Type III 24-hr 100-yr Rainfall=7.61"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					<b>Direct Entry,</b>

**Summary for Subcatchment 4S: DA-4 TO CATCH BASINS**

Runoff = 1.33 cfs @ 12.14 hrs, Volume= 0.105 af, Depth&gt; 5.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Type III 24-hr 100-yr Rainfall=7.61"

Area (sf)	CN	Description
* 5,963	98	impervious
* 4,221	74	hsgC grass, open
10,184	88	Weighted Average
4,221		41.45% Pervious Area
5,963		58.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					<b>Direct Entry,</b>

**Summary for Subcatchment 5S: DA-5 TO CATCH BASINS**

Runoff = 4.29 cfs @ 12.13 hrs, Volume= 0.341 af, Depth&gt; 5.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Type III 24-hr 100-yr Rainfall=7.61"

Area (sf)	CN	Description
* 28,942	98	impervious
* 1,482	74	hsgC grass, open
30,424	97	Weighted Average
1,482		4.87% Pervious Area
28,942		95.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					<b>Direct Entry,</b>

**Summary for Subcatchment 6S: DA-6 RUNOFF TO SWALE ON WEST SIDE OF LOT**

Runoff = 15.79 cfs @ 12.14 hrs, Volume= 1.244 af, Depth&gt; 4.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Type III 24-hr 100-yr Rainfall=7.61"



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Type III 24-hr 100-yr Rainfall=7.61"

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	Area (sf)	CN	Description
*	43,513	98	impervious
*	74,098	72	hsgC wooded, trees
*	12,925	98	roof
	130,536	83	Weighted Average
	74,098		56.76% Pervious Area
	56,438		43.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 7S: DA-7 WESTERLY SLOPE OF OFFSITE**

Runoff = 2.80 cfs @ 12.14 hrs, Volume= 0.220 af, Depth&gt; 5.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

	Area (sf)	CN	Description
*	9,091	98	impervious
*	13,655	74	hsgC grass, open
	22,746	84	Weighted Average
	13,655		60.03% Pervious Area
	9,091		39.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 8S: DA-8 OVERLAND TO LOWER POND**

Runoff = 0.24 cfs @ 12.13 hrs, Volume= 0.019 af, Depth&gt; 5.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

	Area (sf)	CN	Description
*	1,702	98	impervious
	1,702		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

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Type III 24-hr 100-yr Rainfall=7.61"

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**Summary for Subcatchment 9S: DA-9 EASTERLY SLOPE TO OFFSITE**

Runoff = 3.15 cfs @ 12.14 hrs, Volume= 0.250 af, Depth&gt; 4.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

	Area (sf)	CN	Description
*	921	98	impervious
*	13,218	74	hsgC grass, open
*	17,194	72	hsgC wooded, trees
	31,333	74	Weighted Average
	30,412		97.06% Pervious Area
	921		2.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 10S: DA-10 OVERLAND TO SMALL POND**

Runoff = 0.39 cfs @ 12.14 hrs, Volume= 0.031 af, Depth&gt; 4.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

	Area (sf)	CN	Description
*	3,852	74	hsgC grass, open
	3,852		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 16S: NORTH WING ROOF**

Runoff = 1.84 cfs @ 12.13 hrs, Volume= 0.146 af, Depth&gt; 5.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

	Area (sf)	CN	Description
*	12,979	98	roof
	12,979		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**189 MAY ST Fairlawn POSTDEV**

Type III 24-hr 100-yr Rainfall=7.61"

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**Summary for Subcatchment 17S: DA-11 SMALL AREA OF FIRE LANE TO TRENCH DRAIN**

Runoff = 0.45 cfs @ 12.13 hrs, Volume= 0.036 af, Depth&gt; 5.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

	Area (sf)	CN	Description
*	2,311	98	impervious pav
*	1,026	74	pervious grass
	3,337	91	Weighted Average
	1,026		30.75% Pervious Area
	2,311		69.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 18S: NEW BUILDING ADDITION ROOF AREA**

Runoff = 1.03 cfs @ 12.13 hrs, Volume= 0.082 af, Depth&gt; 5.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

	Area (sf)	CN	Description
	7,255	98	Roofs, HSG C
	7,255		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Reach 6R: Swale - runs W to N**

Inflow Area = 3.295 ac, 48.37% Impervious, Inflow Depth > 5.06" for 100-yr event  
 Inflow = 17.63 cfs @ 12.14 hrs, Volume= 1.390 af  
 Outflow = 17.27 cfs @ 12.18 hrs, Volume= 1.387 af, Atten= 2%, Lag= 2.4 min

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Max. Velocity= 4.83 fps, Min. Travel Time= 1.7 min  
 Avg. Velocity= 1.96 fps, Avg. Travel Time= 4.3 min

Peak Storage= 1,782 cf @ 12.18 hrs  
 Average Depth at Peak Storage= 0.60'  
 Bank-Full Depth= 1.50' Flow Area= 13.3 sf, Capacity= 106.43 cfs

**189 MAY ST Fairlawn POSTDEV**

Type III 24-hr 100-yr Rainfall=7.61"

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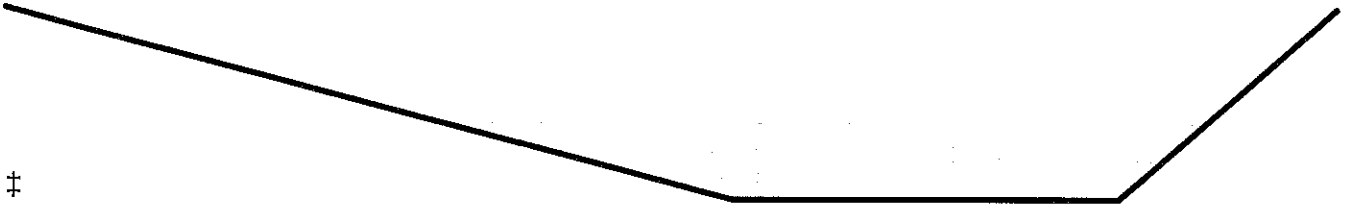
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4.00' x 1.50' deep channel, n= 0.025

Side Slope Z-value= 5.0 1.5 ' Top Width= 13.75'

Length= 500.0' Slope= 0.0200 ' /'

Inlet Invert= 573.00', Outlet Invert= 563.00'

**Summary for Pond 1P: Northerly POND**

Inflow Area = 4.991 ac, 60.62% Impervious, Inflow Depth > 5.27" for 100-yr event  
 Inflow = 26.48 cfs @ 12.19 hrs, Volume= 2.192 af  
 Outflow = 26.54 cfs @ 12.20 hrs, Volume= 2.099 af, Atten= 0%, Lag= 0.5 min  
 Discarded = 0.06 cfs @ 12.20 hrs, Volume= 0.046 af  
 Primary = 26.47 cfs @ 12.20 hrs, Volume= 2.053 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 563.19' @ 12.20 hrs Surf.Area= 2,744 sf Storage= 5,026 cf

Plug-Flow detention time= 23.1 min calculated for 2.076 af (95% of inflow)

Center-of-Mass det. time= 7.8 min ( 791.5 - 783.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	559.44'	7,541 cf	<b>Northerly Pond from Swale (Prismatic) Listed below (Recalc)</b>

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
559.44	0	0	0
560.00	431	121	121
562.00	1,819	2,250	2,371
562.79	2,337	1,642	4,012
563.00	2,585	517	4,529
564.00	3,438	3,012	7,541

Device	Routing	Invert	Outlet Devices
#1	Primary	562.78'	<b>40.0' long x 9.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.46 2.55 2.70 2.69 2.68 2.68 2.67 2.64 2.64 2.64 2.65 2.64 2.65 2.65 2.66 2.67 2.69
#2	Primary	563.30'	<b>40.0' long (Profile 29) Broad-Crested Rectangular Weir</b> Head (feet) 0.49 0.98 1.48 Coef. (English) 3.48 3.50 3.48
#3	Discarded	559.44'	<b>1.020 in/hr Exfiltration over Horizontal area</b>

**189 MAY ST Fairlawn POSTDEV**

Type III 24-hr 100-yr Rainfall=7.61"

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**Discarded OutFlow** Max=0.06 cfs @ 12.20 hrs HW=563.18' (Free Discharge)

↑3=Exfiltration (Exfiltration Controls 0.06 cfs)

**Primary OutFlow** Max=26.28 cfs @ 12.20 hrs HW=563.18' (Free Discharge)

↑1=Broad-Crested Rectangular Weir (Weir Controls 26.28 cfs @ 1.62 fps)

↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

**Summary for Pond 2P: Small Det. Pond**

Inflow Area = 1.657 ac, 84.05% Impervious, Inflow Depth > 5.69" for 100-yr event  
 Inflow = 8.71 cfs @ 12.21 hrs, Volume= 0.786 af  
 Outflow = 9.12 cfs @ 12.21 hrs, Volume= 0.786 af, Atten= 0%, Lag= 0.0 min  
 Primary = 6.07 cfs @ 12.21 hrs, Volume= 0.739 af  
 Secondary = 3.05 cfs @ 12.21 hrs, Volume= 0.047 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 579.32' @ 12.21 hrs Surf.Area= 198 sf Storage= 297 cf

Plug-Flow detention time= 0.4 min calculated for 0.778 af (99% of inflow)

Center-of-Mass det. time= 0.3 min ( 779.2 - 778.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	576.21'	457 cf	<b>Small Detention Pond (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
576.21	0	0	0
577.00	56	22	22
578.00	108	82	104
579.00	162	135	239
580.00	273	218	457

Device	Routing	Invert	Outlet Devices
#1	Primary	576.21'	<b>12.0" Round Culvert to Large Pond</b> L= 49.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 576.21' / 575.71' S= 0.0102 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	579.00'	<b>120.0 deg x 5.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir</b> Cv= 2.48 (C= 3.10)

**Primary OutFlow** Max=6.06 cfs @ 12.21 hrs HW=579.31' TW=563.18' (Dynamic Tailwater)

↑1=Culvert to Large Pond (Barrel Controls 6.06 cfs @ 7.71 fps)

**Secondary OutFlow** Max=2.88 cfs @ 12.21 hrs HW=579.31' TW=563.18' (Dynamic Tailwater)

↑2=Sharp-Crested Vee/Trap Weir (Weir Controls 2.88 cfs @ 1.69 fps)

**189 MAY ST Fairlawn POSTDEV**

Type III 24-hr 100-yr Rainfall=7.61"

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**Summary for Pond 3P: CB IN MAIN DRIVEWAY TO ABUTTING LOT**

Inflow Area = 1.079 ac, 71.88% Impervious, Inflow Depth > 5.58" for 100-yr event  
 Inflow = 6.34 cfs @ 12.13 hrs, Volume= 0.501 af  
 Outflow = 6.34 cfs @ 12.13 hrs, Volume= 0.501 af, Atten= 0%, Lag= 0.0 min  
 Primary = 6.34 cfs @ 12.13 hrs, Volume= 0.501 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 580.27' @ 12.13 hrs

Flood Elev= 584.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	577.00'	<b>12.0" Round Culvert</b> L= 68.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 577.00' / 571.56' S= 0.0800' /' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

**Primary OutFlow** Max=6.02 cfs @ 12.13 hrs HW=580.03' (Free Discharge)↑**1=Culvert** (Inlet Controls 6.02 cfs @ 7.66 fps)**Summary for Pond 8R: DMH with 15" Drainage Pipe**

Inflow Area = 0.394 ac, 94.56% Impervious, Inflow Depth > 5.85" for 100-yr event  
 Inflow = 2.42 cfs @ 12.13 hrs, Volume= 0.192 af  
 Outflow = 2.42 cfs @ 12.13 hrs, Volume= 0.192 af, Atten= 0%, Lag= 0.0 min  
 Primary = 2.42 cfs @ 12.13 hrs, Volume= 0.192 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 583.35' @ 12.31 hrs

Flood Elev= 585.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	580.38'	<b>15.0" Round Culvert</b> L= 177.0' Ke= 0.500 Inlet / Outlet Invert= 580.38' / 579.71' S= 0.0038' /' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=0.00 cfs @ 12.13 hrs HW=581.85' TW=582.54' (Dynamic Tailwater)↑**1=Culvert** ( Controls 0.00 cfs)**Summary for Pond 11R: DMH with 15" Drainage Pipe**

Inflow Area = 1.175 ac, 86.86% Impervious, Inflow Depth > 5.75" for 100-yr event  
 Inflow = 7.10 cfs @ 12.13 hrs, Volume= 0.563 af  
 Outflow = 7.10 cfs @ 12.13 hrs, Volume= 0.563 af, Atten= 0%, Lag= 0.0 min  
 Primary = 7.10 cfs @ 12.13 hrs, Volume= 0.563 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 583.94' @ 12.27 hrs

Flood Elev= 586.35'

Device	Routing	Invert	Outlet Devices
#1	Primary	581.06'	<b>15.0" Round Culvert</b> L= 95.0' CPP, square edge headwall, Ke= 0.500

**189 MAY ST Fairlawn POSTDEV**

Type III 24-hr 100-yr Rainfall=7.61"

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Inlet / Outlet Invert= 581.06' / 580.04' S= 0.0107 ' / Cc= 0.900  
n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=4.46 cfs @ 12.13 hrs HW=583.24' TW=582.55' (Dynamic Tailwater)

1=Culvert (Outlet Controls 4.46 cfs @ 3.64 fps)

**Summary for Pond 12R: DMH 12 OUT TO SMALL POND**

Inflow Area = 1.569 ac, 88.79% Impervious, Inflow Depth > 5.78" for 100-yr event  
Inflow = 9.52 cfs @ 12.13 hrs, Volume= 0.755 af  
Outflow = 8.36 cfs @ 12.21 hrs, Volume= 0.755 af, Atten= 12%, Lag= 4.7 min  
Primary = 8.36 cfs @ 12.21 hrs, Volume= 0.755 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 583.25' @ 12.21 hrs Surf.Area= 502 sf Storage= 1,721 cf

Flood Elev= 586.31' Surf.Area= 502 sf Storage= 2,130 cf

Plug-Flow detention time= 2.1 min calculated for 0.747 af (99% of inflow)

Center-of-Mass det. time= 1.7 min ( 778.3 - 776.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	579.36'	87 cf	4.00'D x 6.95'H Vertical Cone/Cylinder
#2	579.36'	459 cf	36.0" Round Pipe Storage L= 65.0' S= 0.0038 ' /
#3	579.36'	117 cf	15.0" Round Pipe Storage L= 95.0' S= 0.0107 ' /
#4	580.39'	78 cf	4.00'D x 6.23'H Vertical Cone/Cylinder
#5	580.00'	507 cf	4.00'W x 116.00'L x 4.50'H Prismatoid 2,088 cf Overall - 820 cf Embedded = 1,268 cf x 40.0% Voids
#6	580.50'	820 cf	36.0" Round Pipe Storage Inside #5 L= 116.0' S= 0.0050 ' /
#7	581.06'	65 cf	4.00'D x 5.19'H Vertical Cone/Cylinder
2,134 cf			Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	579.36'	15.0" Round Culvert L= 61.0' Ke= 0.500 Inlet / Outlet Invert= 579.36' / 578.98' S= 0.0062 ' / Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	579.36'	13.2" Vert. Orifice/Grate C= 0.600
#3	Device 2	579.35'	12.3" Vert. Orifice/Grate C= 0.600
#4	Device 2	581.40'	10.0" Vert. Orifice/Grate C= 0.600
#5	Device 2	582.00'	4.0' long x 2.50' rise Sharp-Crested Rectangular Weir 2 End Contraction(s) 3.0' Crest Height

**Primary OutFlow** Max=8.25 cfs @ 12.21 hrs HW=583.16' TW=579.31' (Dynamic Tailwater)

1=Culvert (Passes 8.25 cfs of 10.23 cfs potential flow)

2=Orifice/Grate (Orifice Controls 8.25 cfs @ 8.68 fps)

3=Orifice/Grate (Passes < 7.21 cfs potential flow)

4=Orifice/Grate (Passes < 3.04 cfs potential flow)

5=Sharp-Crested Rectangular Weir (Passes < 16.10 cfs potential flow)



- LEGEND**
- EXISTING UNDERGROUND DRAIN OR SEWER PIPE
  - SEWER MANHOLE
  - DRAIN MANHOLE
  - CATCHBASIN WITH HEADER
  - DRYWELL / DROP INLET
  - DOWNSPOUT
  - GAS LINE
  - GAS VALVE
  - GAS METER
  - WATER LINE
  - WATER SHUT OFF
  - EDGE OF PAVEMENT
  - BITUMINOUS BERM
  - UNDERGROUND ELECTRIC LINE
  - OVERHEAD WIRES
  - UTILITY POLE
  - UTILITY POLE WITH LIGHT
  - POLE WITH LIGHT(S)
  - ELECTRIC METER
  - AIR CONDITIONER UNITS
  - MAILBOX
  - RETAINING WALL
  - EXISTING SPOT GRADE
  - FINISH FLOOR ELEVATION
  - 99+4
  - XFF=306.76
  - 8" MAPLE
  - TREE
  - SHRUB

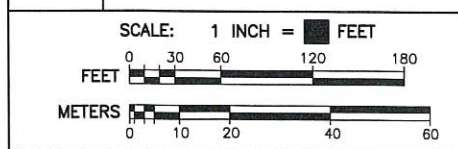


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Professional Engineers Professional Land Surveyors  
Erosion Control Specialists  
51 Main Street, Post Office Box 570, Boylston, MA 01505  
Telephone 508-869-6151 www.thompsonliston.com

CLT. NO.	JOB NO.
3368	348-1876
DATE:	DWG NO.
JUNE 30, 2021	CONCEPTUALSITE6-30-21

REVISIONS	
DATE:	DESCRIPTION



DEFINITIVE SITE PLAN OF LAND AT  
189 MAY STREET  
WORCESTER, MASSACHUSETTS  
OWNED BY:  
NEW ENGLAND REHABILITATION  
WORD BOOK 13501 PAGE 193  
ASRS MBL 51-014-00025  
PREDEVELOPMENT DRAINAGE AREAS





189 MAY STREET  
NEW ENGLAND REHABILITATION  
WDRD BOOK 13501 PAGE 193  
ASRS MBL 51-014-00025  
LOT AREA 20.68 ACRES±

**ZONING COMPLIANCE TABLE:**  
ZONING DISTRICT: IN-H

	REQUIRED OR ALLOWED	EXISTING	PROVIDED
LOT AREA	N/A	900,820	900,820 S.F.
LOT FRONTAGE	N/A	513.02'	513.02'
FRONT YARD	15'	372.6'	433.1'
SIDE YARD	10'	40'	26'
REAR YARD	10'	418.8'	418.8'
HEIGHT (STY)	N/A	4 STORY	4 STORY
HEIGHT (FT.)	N/A	45±	45±
GROSS FLOOR AREA (S.F.)	N/A	97,469	122,509
FLOOR AREA RATIO	N/A	0.11:1	0.14:1

PROPOSED USE: HOSPITAL

**PARKING CALCULATIONS EXISTING & PROPOSED CONDITIONS:**

	REQ'D	EXISTING	PROPOSED
HOSPITAL PARKING REQUIREMENTS			
110 BEDS X 1 SPACE PER BED	110		
OUTPATIENT PHYSICAL THERAPY			
8 EXAM ROOMS X 3 SPACES PER RM	24		
ADDITIONAL SPACES NEEDED FOR SHIFT OVERLAP AND VISITORS	110		
TOTAL PARKING	244	280	251

OF THOSE:

# WHEELCHAIR ACCESSIBLE SPACES	7	12	9
OF THOSE, # VAN ACCESSIBLE	1	9	6
#ELECTRIC VEHICLE SPACES PROVIDED	0	0	6

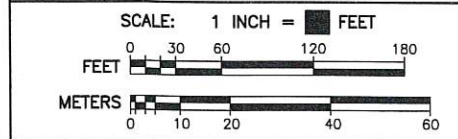
LOADING SPACES

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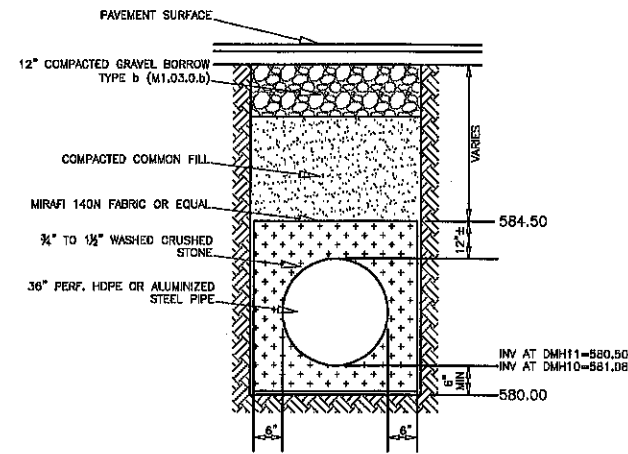
EXISTING CONDITION: IMPERVIOUS 204,717 SQ FT (22.72%)  
PROPOSED CONDITION: IMPERVIOUS 204,694 SQ FT (22.72%)

**THOMPSON-LISTON ASSOCIATES, INC.**  
Professional Engineers Professional Land Surveyors  
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51 Main Street, Post Office Box 570, Boylston, MA 01505  
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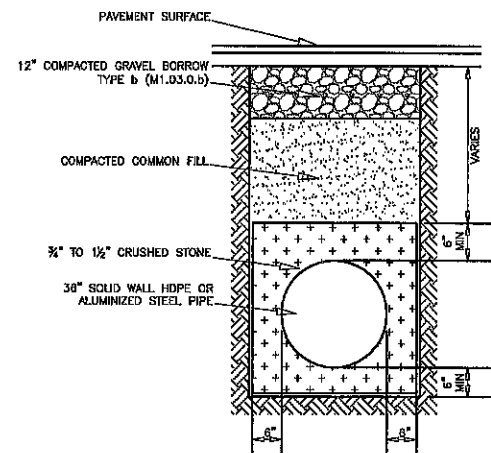
CLT. NO.	JOB NO.
3368	348-1876
DATE:	DWG NO.
AUGUST 3, 2021	SITE PLAN 6-6-21
REVISIONS	
DATE:	DESCRIPTION



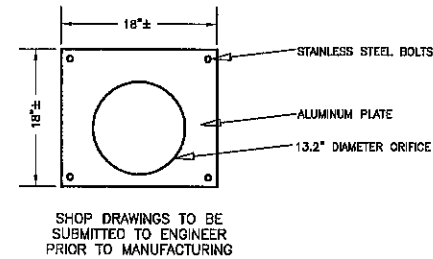
DEFINITIVE SITE PLAN OF LAND AT  
189 MAY STREET  
WORCESTER, MASSACHUSETTS  
OWNED BY:  
NEW ENGLAND REHABILITATION  
WDRD BOOK 13501 PAGE 193  
ASRS MBL 51-014-00025  
POSTDEVELOPMENT DRAINAGE AREAS



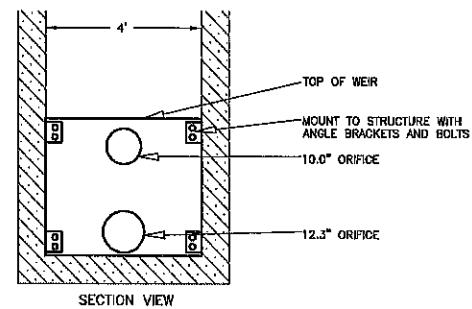
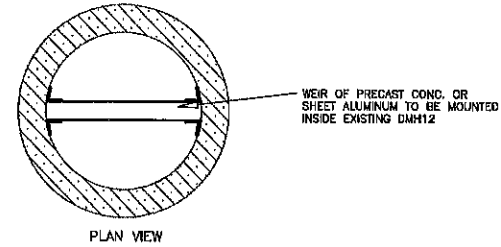
DETAIL OF 36" SUBSURFACE  
DETENTION PIPE FROM  
DMH10 TO DMH11  
NOT TO SCALE



DETAIL OF 36" DRAIN PIPE  
FROM DMH11 TO DMH12  
NOT TO SCALE



DETAIL OF ORIFICE PLATE AT  
DMH12 OUTLET  
NOT TO SCALE



DETAIL OF OUTLET CONTROL  
WEIR AT DMH12  
NOT TO SCALE

#### NOTES:

1. THE MATERIALS, METHODS, AND WORKMANSHIP OF ALL SEWER, DRAIN, AND WATER PIPES PROPOSED HEREON, INCLUDING ALL WORK WITHIN THE PUBLIC STREETS, TRENCHES AND PAVEMENT PATCHES, SHALL COMPLY WITH THE STANDARD DETAILS AND SPECIFICATIONS OF THE WORCESTER DEPARTMENT OF PUBLIC WORKS.
2. UNLESS OTHERWISE NOTED, THE CONSTRUCTION MATERIALS DESCRIBED HEREIN REFER TO THE MASSACHUSETTS DOT, HIGHWAY DEPARTMENT, SPECIFICATIONS FOR HIGHWAYS AND BRIDGES.
3. PAVEMENT REPAIRS IN THE DRIVE AISLES SHALL BE HOT MIX ASPHALT CONCRETE, TYPE I, 1-1/2" TOP COURSE 3/4" AGGREGATE, OVER 2-1/2" DENSE BINDER, INTERMEDIATE AGGREGATE. (M3.11.00)
3. PAVEMENT REPAIRS WITHIN PARKING SPACES SHALL BE HOT MIX ASPHALT CONCRETE, TYPE I, 1" TOP COURSE 3/4" AGGREGATE, OVER 2" DENSE BINDER, INTERMEDIATE AGGREGATE. (M3.11.00)
4. FLOWABLE FILL IN ROAD TRENCHES SHALL MEET THE REQUIREMENTS OF THE CITY OF WORCESTER DEPARTMENT OF PUBLIC WORKS.
5. CEMENT CONCRETE SHALL BE 4,000 PSI, 3/4" AGGREGATE, MIN 610 LBS CEMENT PER CY (M4.02.00)
6. REFER TO LANDSCAPE DRAWINGS FOR SOIL PREPARATION, PLANTINGS, SEED MIX, AND DENSE MIX SURFACING SPECIFICATIONS.
7. DRAINAGE PIPE SHALL BE DR18PVC FROM CATCH BASIN TO MANHOLE AND REINFORCED CONCRETE PIPE ELSEWHERE.
8. SANITARY SEWER PIPE OUTSIDE THE BUILDING ENVELOPE SHALL BE SDR35 PVC. CONNECTIONS TO EXISTING SERVICE SHALL BE MADE IN THE MANNER AND WITH MATERIALS ACCEPTABLE TO THE WORCESTER DPW.
9. FIRE PROTECTION WATER SERVICE SHALL BE INSIDE THE BUILDING.
10. DOMESTIC WATER SERVICE SHALL BE INSIDE THE BUILDING.
11. TRASH AND RECYCLABLES WILL BE STORED IN CLOSED CONTAINERS IN THE EXISTING LOADING AREA.
12. ALL TREES AND SHRUBS PLANTED SHALL BE ASIAN LONGHORNED BEETLE AND EMERALD ASH BORER RESISTANT VARIETIES.
13. THE IMPERVIOUS AREA IS APPROXIMATELY XXXXX S.F. IN THE EXISTING CONDITION AND APPROXIMATELY XXXXX S.F. IN THE PROPOSED.

**THOMPSON-LISTON**  
**ASSOCIATES, INC.**  
Professional Engineers Professional Land Surveyors  
Erosion Control Specialists  
51 Main Street, Post Office Box 570, Boylston, MA 01505  
Telephone 508-868-6151 www.thompsonliston.com

CLT. NO.	JOB NO.
3368	348-1876
DATE:	DWG NO.
AUGUST 3, 2021	SITE PLAN 6-6-21

REVISIONS	
DATE:	DESCRIPTION

DEFINITIVE SITE PLAN OF LAND AT  
189 MAY STREET  
WORCESTER, MASSACHUSETTS  
OWNED BY:  
NEW ENGLAND REHABILITATION  
WDRD BOOK 13501 PAGE 193  
ASRS MBL 51-014-00025

# DRAINAGE REPORT

for

**189 MAY ST, WORCESTER, MA**

Job #348-1876 Client #3368

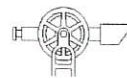
September 14, 2021

## THOMPSON-LISTON ASSOCIATES, INC.

*Professional Engineers Professional Land Surveyors*

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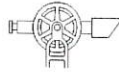
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*Patrick J. Healy 9/14/21*



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## **Drainage Report** for **New England Rehabilitation Services of Central Massachusetts, Inc.** **Proposed redevelopment of the site at 189 May Street Worcester, Massachusetts**

**September 14, 2021**

### **Project Description**

The site is located on the south-westerly side of May Street, south-easterly of Fairlawn Drive and north-westerly of Hadwen Arboretum at Clark University. The property is presently owned by New England Rehabilitation Services of Central Massachusetts, INC. It presently serves as a hospital.

The Applicant, New England Rehabilitation Services of Central Massachusetts, Inc., proposes to construct an addition onto the existing north wing of the hospital with associated ambulance access bay, walkway and entryway for pedestrian use, and several new islands and parking reconfiguration in order to allow for safe and efficient flow of vehicle and pedestrian traffic. On the southerly side of the site, additional landscaped area and walkways are proposed leading to an existing gazebo. On the westerly side of the site, existing pavement is proposed to be removed in order to plant additional grass.

This report compares the drainage conditions of the proposed development to the predevelopment conditions of the site. The predevelopment condition includes the most recent improvements that were made to the site in the 2004-2005 time frame, when the parking lot was expanded and the drainage system was improved.

Soils on this site are categorized on the United States Department of Agriculture (USDA) Web Soil Survey soil maps as being "Paxton fine sandy loam" soils with 3 to 8 percent slopes in most areas and 8 to 15 percent slopes in remaining areas. In actuality, the geotechnical borings show an underlying soils with fines in the range of 15% to 40%. As with some other hilltop sites in the area, the glacial till in these situations is very dense, and with the high percentage of fines is highly expansive with frost. The site soils are unsuitable for any type of infiltration systems. For the purpose of the drainage study, we have categorized the soils as hydrologic soil group "C" soils based on the soil maps and properties of the Paxton soils.

### **Methodology**

In order to evaluate the existing and proposed hydrologic conditions of the site, we have employed the HydroCAD™ stormwater modeling software, which emulates the United States Department of Agriculture, Soil Conservation Service (SCS) hydrograph method as outlined in Technical Release 20 (1982). We have used the SCS modified soil cover complex method of evaluating cover conditions and underlying soil features in developing runoff curve numbers (RCN), and have determined Times of Concentration (ToC), using the methods described in the SCS's National Engineering Handbook, Section 4, Hydrology (1985). Each watershed with its Area, RCN and ToC, is described as a "Subcatchment" in HydroCAD™.

HydroCAD™ uses the Storage-Indication method for routing flows from “Subcatchment” areas through “Reaches” and “Ponds.” Reaches are overland flow paths, pipe segments, or stream segments. Ponds are areas that collect water, such as basins, ponds, or swales where outlet devices control outflow.

Rainfall was determined from the maps in the National Oceanic and Atmospheric Administration (NOAA), ATLAS 14 Point Precipitation Frequency Estimates for the locus. The SCS’s Type III Rainfall Distribution is used for these calculations and is described in SCS Technical Release 55 (1986). The 2-, 10-, 25- and 100-year return frequency storms were studied with 24-hour rainfalls of 3.14, 4.87, 5.95 and 7.61 inches respectively.

### **Design Points**

The design points for this report consist of the northerly pond that the swale leads into, the slope that runs westerly before the start of the swale, the catch basin on the driveway near the entrance to the northerly parking, and the abutting easterly parking lot that collects runoff from the slope near the gazebo. These locations were chosen because they are locations where runoff from the site ends up and they can be compared for pre- and post-development.

Flows to the northerly pond are modeled as pond #1P in the pre- and post-development conditions. Flows to the westerly slope are modeled as Subcatchment 7 in the pre- and post-development conditions. Flows to the catch basin in the driveway are modeled as Pond 3 on the pre- and post-development conditions. Flows to the easterly abutting parking lot are modeled as Subcatchment 9 on the pre- and post-development conditions.

### **Calculation Summary and Comparison of Flows:**

In all of the storms studied, the 2-, 10-, 25- and 100-year storms, the runoff leaving the site in the post-development condition will not exceed the peak runoff in the existing (pre-development) condition.

The following table compares the pre- and post-development flows at the Design Points:

Respectfully submitted,

THOMPSON-LISTON ASSOCIATES, INC.



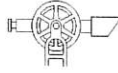
Patrick J. Healy, P.E.  
Project Manager / Civil Engineer

**TABLE A**  
**Runoff Summaries for Storm Events**

<b>Design Point</b>	<b>2-YR</b>	<b>10-YR</b>	<b>25-YR</b>	<b>100-YR</b>
<b>1. Northerly Pond</b>				
Pond 1P pre	8.77 cfs	15.21 cfs	19.65 cfs	26.47 cfs
Pond 1P post	8.77	15.09	19.61	26.47
<b>2. Catch Basin in Driveway</b>				
Reach 9R pre	2.80 cfs	4.65 cfs	5.78 cfs	7.52 cfs
Reach 9R post	2.67	4.50	5.64	7.37
<b>3. Abutting Easterly Lot</b>				
Reach 10R pre	0.65 cfs	1.58 cfs	2.21 cfs	3.23 cfs
Reach 10R post	0.63	1.54	2.16	3.15
<b>4. Westerly Slope</b>				
Reach 7R pre	0.82 cfs	1.57 cfs	2.05 cfs	2.80 cfs
Reach 7R post	0.82	1.57	2.05	2.80



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## **Stormwater Standards Compliance Statement Fairlawn Hospital Addition and Renovation 189 May Street Worcester, Massachusetts**

**September 14, 2021**

A portion of the existing building entrance canopy and paved areas will be removed and replaced with a building addition that will serve as the new main entrance and ambulance entrance to the hospital, as well as new rooms on the upper floors. The renovations and expansion will not result in additional patient beds or uses, but will convert several multi-patient rooms, and new rooms to private or semi-private rooms. Portions of the lot will be redeveloped to construct the addition, relocate accessible parking spaces and walks, and improve emergency vehicle access. As a redevelopment project, the project will comply with the Massachusetts DEP Stormwater Standards only to the extent practicable, as described below. Where a particular Standard does not apply to the project, an explanation is provided. Each statement either describes compliance with those Standards that are applicable to the scope of work proposed.

### **STANDARD 1 – NO NEW UNTREATED DISCHARGES**

Runoff from the site includes runoff from roofs, paved areas, and landscaped areas. Stormwater runoff from existing paved driveways and roofs currently runs off in four separate directions, which we evaluated and for which we designed mitigating measures to limit the postdevelopment runoff to or below the predevelopment levels. Much of the area of redevelopment flows to two drainage systems, to the existing parking lot drainage system toward an existing detention basin to the north, and to catch basins in the main driveway which connection downslope toward May street through easements on the adjacent property to the east. To the southeast and southwest some areas contribute overland flow to adjacent properties. In the proposed condition, the runoff from impervious driveways will generally slope and runoff in the same directions. The roof runoff of the new building addition and patient drop off canopy will be connected by pipes to the existing parking lot drainage system to the north. The piped drainage system will then be retrofitted to constrict the pipe leading out the existing surface detention basin, in order to avoid divert the discharge through a subsurface detention/infiltration BMP. Although there is a net increase of 7,013 sq. ft. of impervious area, the actual peak rate and volume of runoff will be less in the proposed condition. No new untreated discharges are proposed.

### **STANDARD 2 – PEAK RATE ATTENUATION**

As described in the report and hydrologic calculations, the peak rate of runoff will be mitigated for the 2, 10, 25, and 100-year storms. so there is no contribution to off-site flooding.

### **STANDARD 3 – RECHARGE**

Though the redevelopment results in a modest increase to impervious cover, and equivalent area of impervious parking lot will be removed on the west edge of the parking lot, so the project does not result in an increase in impervious cover. Soil types present on the site are identified as Paxton fine sandy loam, which would normally be classified as hydrologic group C soil. However, the soil borings in the area of development indicate dense glacial till with inordinate fine content, between

25%-40% passing the #200 sieve. This type of soil is unsuitable for any type of infiltration systems whether open air or subsurface. As such, we will not be proposing any recharge.

#### STANDARD 4 – WATER QUALITY

Standard 4 is also based up on the amount of new impervious surfaces being created on a site. As stated in the prior section, no increase in the impervious cover is proposed by this project.

In this case, all runoff from the altered impervious parking area and walks will continue to be directed to deep sump catch basins and walks. Once small area of the fire lane will be collected into a trench drain with a sump, and will be piped around the ambulance bay. The roof runoff is considered clean and is not subject to the Standard 4 requirements.

#### STANDARD 5 – LUHPPLs

Site does not fall into this category.

#### STANDARD 6 – CRITICAL AREAS

Site is not in or near a critical area as defined in the DEP Stormwater Handbook.

#### STANDARD 7 – REDEVELOPMENT

As a redevelopment site, the modest increase in impervious cover is mitigated through the reduction of paved surface in another area of the site. The redevelopment of the site will represent an improvement in stormwater management in terms of reduction of the peak rate of flow through additional mitigation. In addition, there will be an O&M plan in place for improved long term water quality and protection of stormwater infrastructure.

#### STANDARD 8 – CONSTRUCTION PERIOD CONTROLS

An Erosion and Sedimentation Control Plan has been developed, and is shown on the plans. Details of the BMPs are shown on the Detail Sheet of the Site Plan.

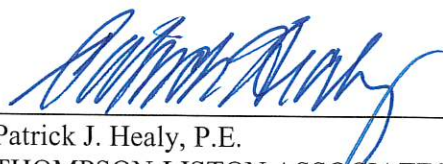
#### STANDARD 9 – OPERATION AND MAINTENANCE PLAN

An Operation and Maintenance Program covering the construction period and post-construction period maintenance and inspection requirements of the proposed stormwater structures has been written and is included herewith.

#### STANDARD 10 – PROHIBITION OF ILLICIT DISCHARGES

Provisions will be made to prevent illicit non-stormwater discharges to waters of the Commonwealth. The owner is cognizant of the effects upon the environment of improper disposal of wastewater, process waste, raw materials, toxic and hazardous substances, oil and grease, and seeks to prevent damage to the environment. Such substances if present shall be stored in covered containers or within parked vehicles on the site and will not be exposed to rainfall. Spill kits will be stored on site and replenished as necessary to prevent the migration of potential contaminants.

Prepared by:

  
Patrick J. Healy, P.E.  
THOMPSON-LISTON ASSOCIATES, INC

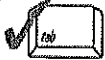




# Checklist for Stormwater Report

## A. Introduction

**Important:** When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.<sup>1</sup> This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8<sup>2</sup>
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

<sup>1</sup> The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

<sup>2</sup> For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.



# Checklist for Stormwater Report

## B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

*Note:* Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

### Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



Signature and Date

## Checklist

**Project Type:** Is the application for new development, redevelopment, or a mix of new and redevelopment?

- ☐ New development
- ☒ Redevelopment
- ☐ Mix of New Development and Redevelopment



# Checklist for Stormwater Report

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## Checklist (continued)

**LID Measures:** Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- ☒ No disturbance to any Wetland Resource Areas
- ☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- ☒ Reduced Impervious Area (Redevelopment Only)
- ☒ Minimizing disturbance to existing trees and shrubs
- ☐ LID Site Design Credit Requested:
  - ☐ Credit 1
  - ☐ Credit 2
  - ☐ Credit 3
- ☐ Use of "country drainage" versus curb and gutter conveyance and pipe
- ☐ Bioretention Cells (includes Rain Gardens)
- ☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- ☐ Treebox Filter
- ☐ Water Quality Swale
- ☐ Grass Channel
- ☐ Green Roof
- ☐ Other (describe): \_\_\_\_\_

## Standard 1: No New Untreated Discharges

- ☒ No new untreated discharges
- ☐ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- ☒ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.



# Checklist for Stormwater Report

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## Checklist (continued)

### Standard 2: Peak Rate Attenuation

- ☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.
- ☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.
- ☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

### Standard 3: Recharge

- ☒ Soil Analysis provided.
- ☐ Required Recharge Volume calculation provided.
- ☐ Required Recharge volume reduced through use of the LID site Design Credits.
- ☐ Sizing the infiltration, BMPs is based on the following method: Check the method used.
  - ☐ Static
  - ☐ Simple Dynamic
  - ☐ Dynamic Field<sup>1</sup>
- ☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.
- ☐ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.
- ☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.
- ☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:
  - ☒ Site is comprised solely of C and D soils and/or bedrock at the land surface
  - ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
  - ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
  - ☒ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.
- ☐ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.
- ☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

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<sup>1</sup> 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.



# Checklist for Stormwater Report

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## Checklist (continued)

### Standard 3: Recharge (continued)

- ☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.
- ☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

### Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
  - Provisions for storing materials and waste products inside or under cover;
  - Vehicle washing controls;
  - Requirements for routine inspections and maintenance of stormwater BMPs;
  - Spill prevention and response plans;
  - Provisions for maintenance of lawns, gardens, and other landscaped areas;
  - Requirements for storage and use of fertilizers, herbicides, and pesticides;
  - Pet waste management provisions;
  - Provisions for operation and management of septic systems;
  - Provisions for solid waste management;
  - Snow disposal and plowing plans relative to Wetland Resource Areas;
  - Winter Road Salt and/or Sand Use and Storage restrictions;
  - Street sweeping schedules;
  - Provisions for prevention of illicit discharges to the stormwater management system;
  - Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
  - Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
  - List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.
- ☐ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.
  - ☐ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:
    - ☐ is within the Zone II or Interim Wellhead Protection Area
    - ☐ is near or to other critical areas
    - ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
    - ☐ involves runoff from land uses with higher potential pollutant loads.
  - ☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.
  - ☐ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.



# Checklist for Stormwater Report

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## Checklist (continued)

### Standard 4: Water Quality (continued)

- ☐ The BMP is sized (and calculations provided) based on:
  - ☐ The ½" or 1" Water Quality Volume or
  - ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
- ☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the proprietary BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.
- ☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

### Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

- ☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.
- ☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted **prior to** the discharge of stormwater to the post-construction stormwater BMPs.
- ☐ The NPDES Multi-Sector General Permit does **not** cover the land use.
- ☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.
- ☐ All exposure has been eliminated.
- ☐ All exposure has **not** been eliminated and all BMPs selected are on MassDEP LUHPPL list.
- ☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

### Standard 6: Critical Areas

- ☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.
- ☐ Critical areas and BMPs are identified in the Stormwater Report.



# Checklist for Stormwater Report

## Checklist (continued)

### Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

- ☒ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:
  - ☐ Limited Project
  - ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
  - ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
  - ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
  - ☐ Bike Path and/or Foot Path
- ☒ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.
- ☒ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.
- ☒ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

### Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
  - Construction Period Operation and Maintenance Plan;
  - Names of Persons or Entity Responsible for Plan Compliance;
  - Construction Period Pollution Prevention Measures;
  - Erosion and Sedimentation Control Plan Drawings;
  - Detail drawings and specifications for erosion control BMPs, including sizing calculations;
  - Vegetation Planning;
  - Site Development Plan;
  - Construction Sequencing Plan;
  - Sequencing of Erosion and Sedimentation Controls;
  - Operation and Maintenance of Erosion and Sedimentation Controls;
  - Inspection Schedule;
  - Maintenance Schedule;
  - Inspection and Maintenance Log Form.
- ☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.



# Checklist for Stormwater Report

## Checklist (continued)

### Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

- ☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has **not** been included in the Stormwater Report but will be submitted **before** land disturbance begins.
- ☒ The project is **not** covered by a NPDES Construction General Permit.
- ☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.
- ☐ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted **BEFORE** land disturbance begins.

### Standard 9: Operation and Maintenance Plan

- ☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:
  - ☐ Name of the stormwater management system owners;
  - ☐ Party responsible for operation and maintenance;
  - ☐ Schedule for implementation of routine and non-routine maintenance tasks;
  - ☐ Plan showing the location of all stormwater BMPs maintenance access areas;
  - ☐ Description and delineation of public safety features;
  - ☐ Estimated operation and maintenance budget; and
  - ☐ Operation and Maintenance Log Form.
- ☐ The responsible party is **not** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:
  - ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
  - ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

### Standard 10: Prohibition of Illicit Discharges

- ☒ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;
- ☐ An Illicit Discharge Compliance Statement is attached;
- ☐ NO Illicit Discharge Compliance Statement is attached but will be submitted **prior to** the discharge of any stormwater to post-construction BMPs.



Soil Map—Worcester County, Massachusetts, Northeastern Part



Natural Resources  
Conservation Service

Web Soil Survey  
National Cooperative Soil Survey

7/12/2021  
Page 1 of 3

Soil Map—Worcester County, Massachusetts, Northeastern Part

## MAP LEGEND

<b>Area of Interest (AOI)</b>		Spoil Area
Area of Interest (AOI)		Stony Spot
<b>Soils</b>		Very Stony Spot
Soil Map Unit Polygons		Wet Spot
Soil Map Unit Lines		Other
Soil Map Unit Points		Special Line Features
<b>Special Point Features</b>		<b>Water Features</b>
Blowout		Streams and Canals
Borrow Pit		<b>Transportation</b>
Clay Spot		Rails
Closed Depression		Interstate Highways
Gravel Pit		US Routes
Gravelly Spot		Major Roads
Landfill		Local Roads
Lava Flow		<b>Background</b>
Marsh or swamp		Aerial Photography
Mine or Quarry		
Miscellaneous Water		
Perennial Water		
Rock Outcrop		
Saline Spot		
Sandy Spot		
Severely Eroded Spot		
Sinkhole		
Slide or Slip		
Sodic Spot		

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL:  
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Worcester County, Massachusetts, Northeastern Part  
Survey Area Data: Version 15, Jun 10, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

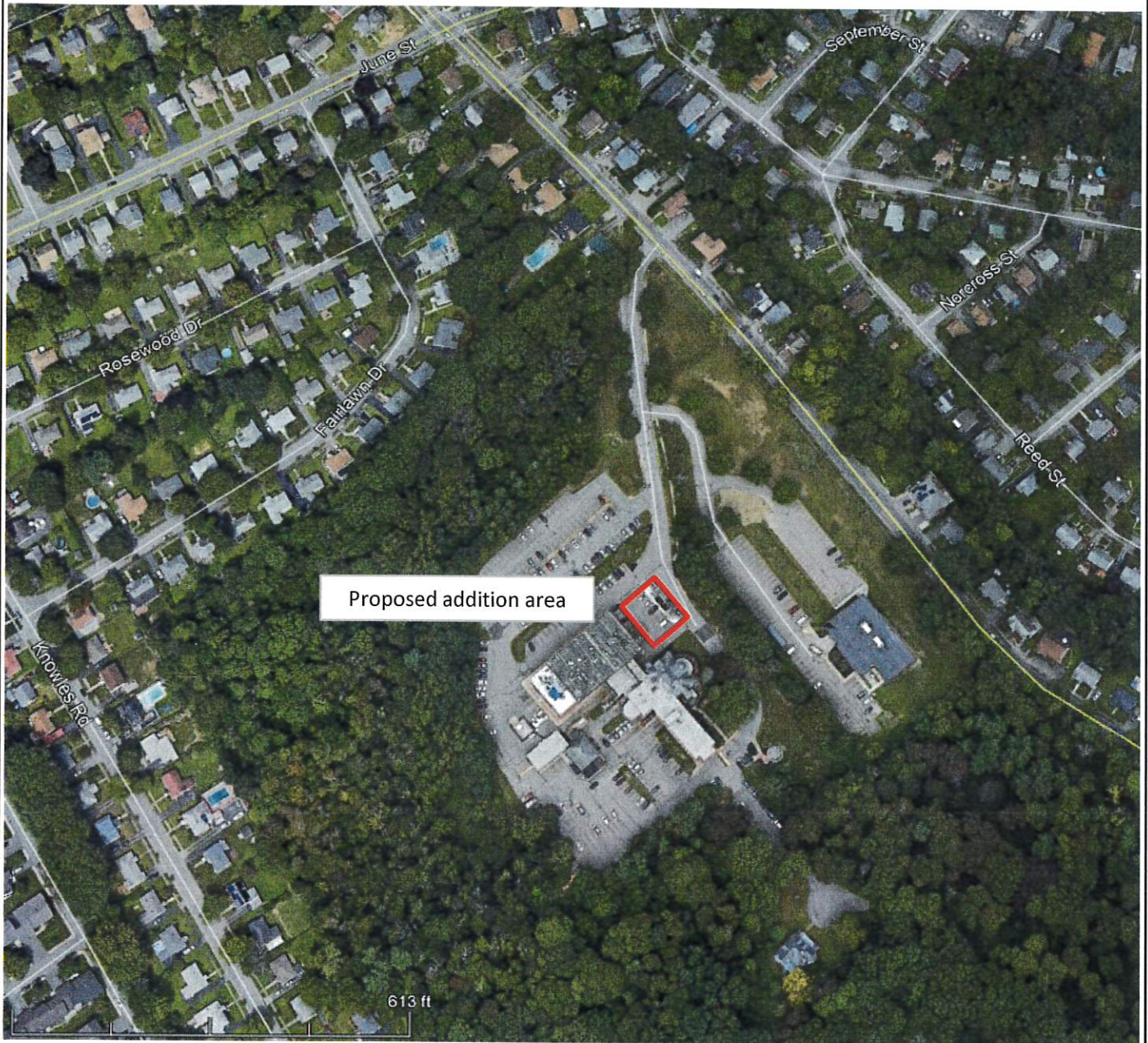
Date(s) aerial images were photographed: Sep 12, 2014—Sep 28, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

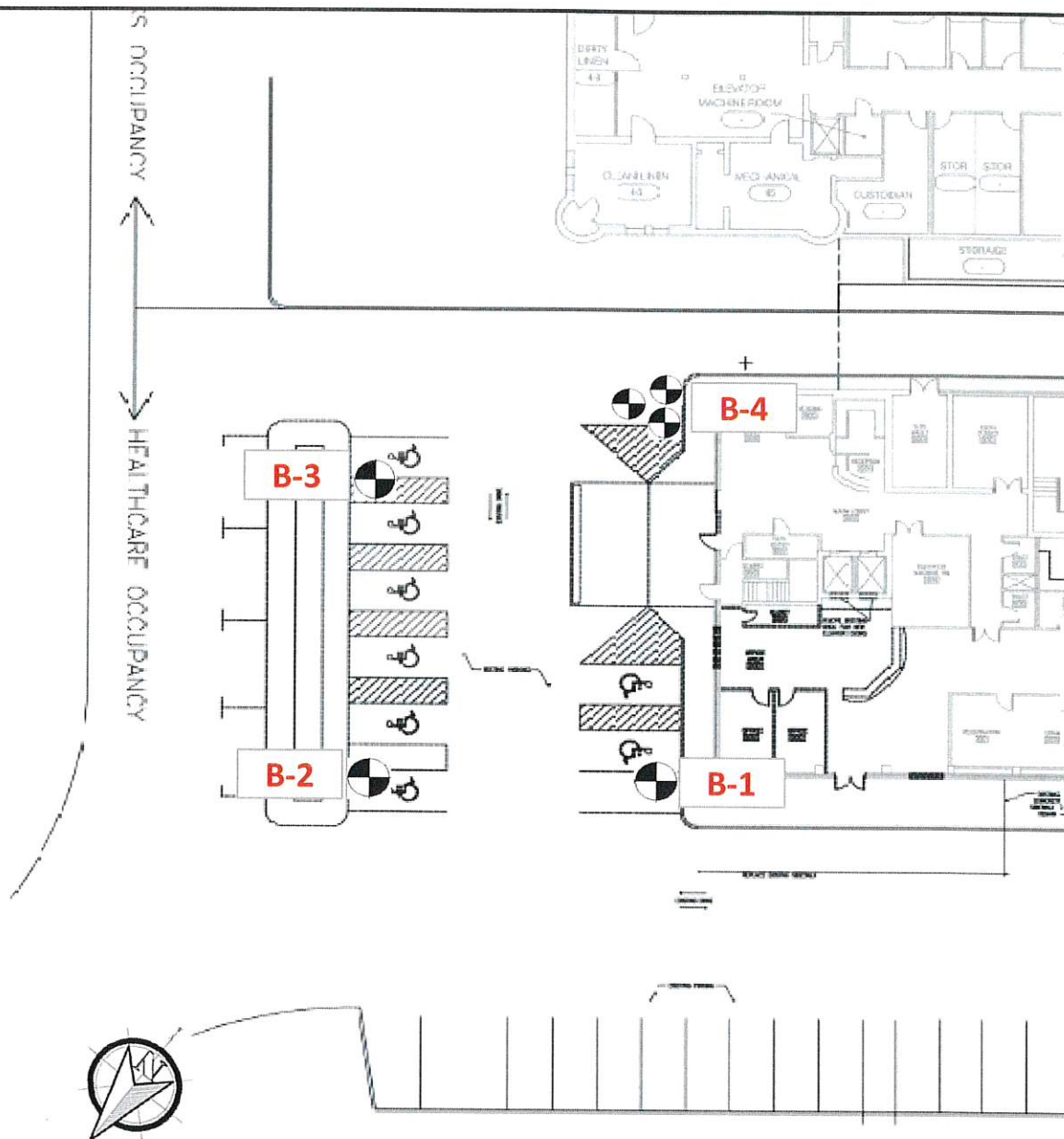
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
31A	Walpole sandy loam, 0 to 3 percent slopes	4.4	15.1%
305B	Paxton fine sandy loam, 3 to 8 percent slopes	8.4	28.3%
305C	Paxton fine sandy loam, 8 to 15 percent slopes	13.8	46.7%
622C	Paxton-Urban land complex, 8 to 15 percent slopes	1.2	4.2%
625C	Hinckley-Urban land complex, 0 to 15 percent slopes	1.7	5.7%
<b>Totals for Area of Interest</b>		<b>29.5</b>	<b>100.0%</b>





<b>Yankee Engineering &amp; Testing, Inc.</b> 10 Mason Street Worcester, MA 10609 Phone: (508) 831-7404 • Fax: (508) 831-7388		<b>Project:</b> Fairlawn Rehabilitation Hospital <b>Location:</b> 189 May Street, Worcester, MA <b>Project #:</b> 19103 <b>Date:</b> May 10, 2021 <b>Client:</b> Encompass Health
<b>FROM:</b> Google Earth Aerial photo	<b>SITE LOCUS PLAN FIGURE 1</b>	<b>Approx. Scale</b> See Map Scale





GROUND FLOOR EXISTING PLAN

SCALE: 1/8" = 1'-0"

**Yankee Engineering & Testing, Inc.**

10 Mason Street  
Worcester, MA 01609  
Phone: (508) 831-7404  
Fax: (508) 831-7388

**Project:**

Fiarlawn Rehabilitation Hospital

**Location:**

189 May Street, Worcester, MA

**Project #:**

19103

**Date:**

May 10, 2021

**Client:**

Encompass Health

FROM: Schematic Site Plan

**BORING LOCATION PLAN  
FIGURE 2**

**Approx. Scale:**  
See map scale

# SOIL TEST BORING LOG

Boring #	<b>B - 1</b>
Sheet #	1 of 1
Location:	Addition west
Elevation:	≈ 597'
Drill Date:	5/10/2021

Client: Encompass Health  
 Project: Fairlawn Rehabilitation Hospital  
 Project Address: 189 May Street, Worcester, MA  
 Project No.: 19103

Drilling Type	Type Size Hammer Fall	SPT 2" I.D. 140 lbs 30"	Groundwater Observations		
			Depth (ft)	Casing at	Stabilization Period
			No GW	n/a	Upon boring completion

Depth (ft)	No.	Depth (ft)	Pen. (in)	Rec. (in)	Blows/6"	Strata Change	Sample Descriptions & Geotechnical Observations	Remarks
1	S-1	0 - 2	24	10	6 - 2		Brown/gray, moist, VERY LOOSE, silty SAND little gravel/asphalt	4" Asphalt
2					2 - 5			Fill
3	S-2	2 - 4	24	26	20 - 17	2'	Gray/brown, damp, dense, silty SAND little gravel	
4					21 - 25			Native
5								
6	S-3	5 - 6'3"	15	9	22 - 25		Gray/brown, damp, very dense, silty SAND and GRAVEL	
7					50+/3'			
8						6'	Auger refusal on suspected boulder at 6' in native silty SAND and GRAVEL	≈ 597'
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								

Drilling Co.:	Soil Ex Corp	Cohesive (blows/ft)		Cohesionless (blows/ft)		<ul style="list-style-type: none"> <li>Refer to geotechnical report dated 5/17/21 for additional information</li> <li>Ground elevation based on existing ground surface</li> <li></li> </ul>
Rig Type:	Mobile B57 Truck	0 - 2	Very Soft	0 - 3	Very Loose	
Driller:	Mr. Rich Bonetti	2 - 4	Soft	4 - 9	Loose	
Helper:	Mr. Josh Goodale	5 - 8	Medium Stiff	10 - 29	Medium Dense	
Inspector:	Mr. Joel Morin	9 - 15	Stiff	30 - 49	Dense	
Client Rep.:	Mr. Joseph Durkin	16 - 30	Hard	50+/ft	Very Dense	

# SOIL TEST BORING LOG

Boring #	<b>B - 2</b>
Sheet #	1 of 1
Location:	Addition north
Elevation:	≈ 597'
Drill Date:	5/10/2021

Client: Encompass Health  
 Project: Fairlawn Rehabilitation Hospital  
 Project Address: 189 May Street, Worcester, MA  
 Project No.: 19103

Drilling Type	Type Size Hammer Fall	SPT 2" I.D. 140 lbs 30"	Groundwater Observations		
			Depth (ft)	Casing at	Stabilization Period
			10'	n/a	Upon boring completion

Depth (ft)	No.	Depth (ft)	Pen. (in)	Rec. (in)	Blows/6"	Strata Change	Sample Descriptions & Geotechnical Observations	Remarks
1	S-1	0 - 2	24	11	4 - 3		3" Gray/black, reclaimed gravel/asphalt	4" Asphalt
2					5 - 9		8" Brown/gray, damp, LOOSE, silty sand some gravel	Fill
3	S-2	2 - 4	24	20	15 - 21	2'	Same as S-1 but dense	Native
4					20 - 22			
5								
6	S-3	5 - 7	24	16	18 - 36		Same as S-1 but very dense	Native
7					49 - 41			
8	S-4	7 - 7'3"	3	3	50+ / 3"		Same as S-1 but very dense	Native
9								
10						☑		
11	S-5	10 - 12	24	14	15 - 17	10'	Same as S-1 but very dense and moist	Native
12					43 - 20			
13								
14								
15								
16	S-6	15 - 17	24	18	10 - 19		Brown/gray, moist, dense, SILT and SAND trace gravel	Native
17					27 - 33			
18								
19								
20								
21	S-7	20 - 22	24	12	14 - 32		Gray, moist, very dense, silty SAND trace gravel	Native
22					32 - 38			
23						22'	Boring terminated at 22' in native silty SAND trace gravel	≈ 575'
24								
25								

Drilling Co.:	Soil Ex Corp	<u>Cohesive (blows/ft)</u>		<u>Cohesionless (blows/ft)</u>		<ul style="list-style-type: none"> <li>Refer to geotechnical report dated 5/17/21 for additional information</li> <li>Ground elevation based on existing ground surface</li> </ul>
Rig Type:	Mobile B57 Truck	0 - 2	Very Soft	0 - 3	Very Loose	
Driller:	Mr. Rich Bonetti	2 - 4	Soft	4 - 9	Loose	
Helper:	Mr. Josh Goodale	5 - 8	Medium Stiff	10 - 29	Medium Dense	
Inspector:	Mr. Joel Morin	9 - 15	Stiff	30 - 49	Dense	
Client Rep.:	Mr. Joeseeph Durkin	16 - 30	Hard	50+ / ft	Very Dense	

# SOIL TEST BORING LOG

Boring #	<b>B - 3</b>
Sheet #	1 of 1
Location:	Addition east
Elevation:	≈ 598'
Drill Date:	5/10/2021

Client: Encompass Health  
 Project: Fairlawn Rehabilitation Hospital  
 Project Address: 189 May Street, Worcester, MA  
 Project No.: 19103

Drilling Type	Type	SPT	Groundwater Observations		
			Depth (ft)	Casing at	Stabilization Period
	2" I.D. Hammer Fall	140 lbs 30"	10'	n/a	Upon boring completion

Depth (ft)	Boring Sampling Data					Strata Change	Sample Descriptions & Geotechnical Observations	Remarks
	No.	Depth (ft)	Pen. (in)	Rec. (in)	Blows/6"			
1	S-1	0 - 2	24	12	5 - 14	2'	4" Gray, damp, sand and gravel/asphalt	4" Asphalt
2					17 - 15		8" Brown, moist, dense, silty SAND and gravel	Fill
3					18 - 22		Brown, damp, very dense, silty SAND and gravel	Native
4					28 - 21			
5	S-3	5 - 7	24	16	44 - 40	10'	Same as S-2	Native
6					40 - 32			
7								
8					43 - 50+/6"		Brown, damp, very dense, silty SAND some gravel	Native
9	S-4	7 - 8	12	12		X		
10								
11								
12								
13	S-5	10 - 12	24	14	13 - 14	10'	Same as S-2 but medium dense and moist	Native
14					11 - 15			
15								
16								
17	S-6	15 - 17	24	18	15 - 22	10'	Same as S-2 but dense	Native
18					27 - 24			
19								
20								
21	S-7	20 - 22	13	16	23 - 38	22'	Brown, damp, very dense, silty SAND little gravel	Native
22					50+/1"			
23								
24								
25							Boring terminated at 22' in native silty SAND little gravel	≈ 576'

Drilling Co.:	Soil Ex Corp	Cohesive (blows/ft)		Cohesionless (blows/ft)		<ul style="list-style-type: none"> <li>Refer to geotechnical report dated 5/17/21 for additional information</li> <li>Ground elevation based on existing ground surface</li> </ul>
Rig Type:	Mobile B57 Truck	0 - 2	Very Soft	0 - 3	Very Loose	
Driller:	Mr. Rich Bonetti	2 - 4	Soft	4 - 9	Loose	
Helper:	Mr. Josh Goodale	5 - 8	Medium Stiff	10 - 29	Medium Dense	
Inspector:	Mr. Joel Morin	9 - 15	Stiff	30 - 49	Dense	
Client Rep.:	Mr. Joseph Durkin	16 - 30	Hard	50+ft	Very Dense	



# SOIL TEST BORING LOG

Boring #	<b>B - 4</b>
Sheet #	1 of 1
Location:	Addition south
Elevation:	≈ 597'
Drill Date:	5/10/2021

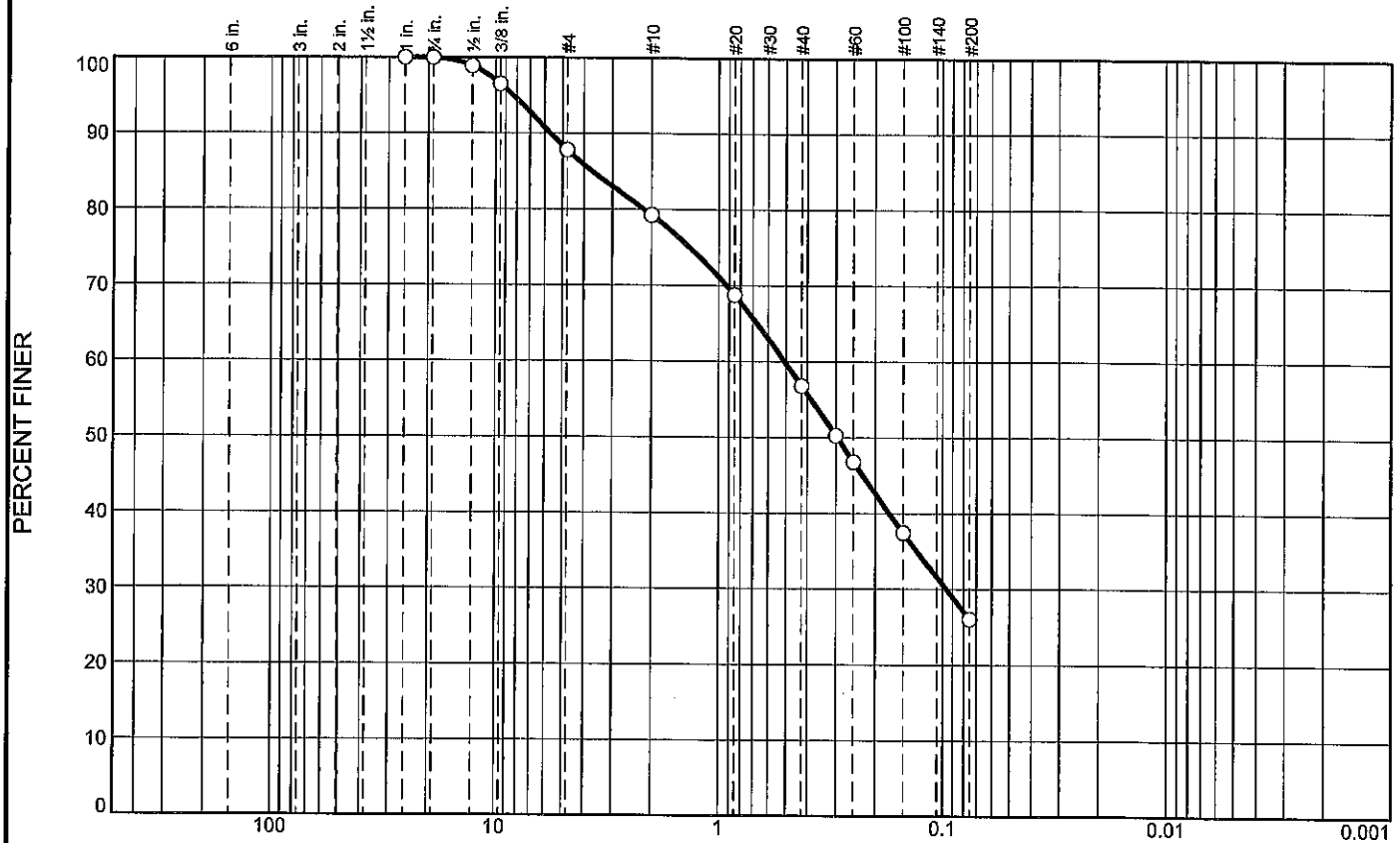
Client: Encompass Health  
 Project: Fairlawn Rehabilitation Hospital  
 Project Address: 189 May Street, Worcester, MA  
 Project No.: 19103

Drilling Type	Type Size Hammer Fall	SPT 2" I.D. 140 lbs 30"	Groundwater Observations		
			Depth (ft)	Casing at	Stabilization Period
			No GW	n/a	Upon boring completion

Depth (ft)	No.	Depth (ft)	Pen. (in)	Rec. (in)	Blows/6"	Strata Change	Sample Descriptions & Geotechnical Observations	Remarks
1	S-1	0 - 2	24	6	4 - 3		2" Gray, damp, sand and gravel	4" Asphalt
2					5 - 8		4" Brown, damp, LOOSE, silty sand and gravel	Fill
3	S-2	2 - 4	24	10	5 - 10	2'	Brown/gray, damp, medium dense, silty SAND little gravel	Native
4					17 - 12			
5							Refusal x 2; move 3' away from existing building	Native
6	S-3	5 - 6'3"	15	8	19 - 30		Same as S-2 but very dense	
7					50 +/-3"			
8						6'3"	Boring terminated with auger refusal on suspected boulder at 6'3" after attempting 3 holes in native silty sand and gravel	≈ 591'
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								

Drilling Co.: Soil Ex Corp	Cohesive (blows/ft)	Cohesionless (blows/ft)	<ul style="list-style-type: none"> <li>Refer to geotechnical report dated 5/17/21 for additional information</li> <li>Ground elevation based on existing ground surface</li> </ul>
Rig Type: Mobile B57 Truck	0 - 2 Very Soft	0 - 3 Very Loose	
Driller: Mr. Rich Bonetti	2 - 4 Soft	4 - 9 Loose	
Helper: Mr. Josh Goodale	5 - 8 Medium Stiff	10 - 29 Medium Dense	
Inspector: Mr. Joel Morin	9 - 15 Stiff	30 - 49 Dense	
Client Rep.: Mr. Joseph Durkin	16 - 30 Hard	50 +/-ft Very Dense	

# Particle Size Distribution Report



% +3"	% Gravel	% Sand	% Silt	% Clay
0.0	12.2	61.7	26.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	100.0		
1/2"	98.9		
3/8"	96.5		
#4	87.8		
#10	79.3		
#20	68.8		
#40	56.8		
#50	50.3		
#60	46.8		
#100	37.5		
#200	26.1		

\* (no specification provided)

**Material Description**  
Brown SAND some silt little gravel

**Atterberg Limits**  
 PL= NP      LL= NV      PI= NP

**Coefficients**  
 D<sub>85</sub>= 3.6700      D<sub>60</sub>= 0.5060      D<sub>50</sub>= 0.2957  
 D<sub>30</sub>= 0.0959      D<sub>15</sub>=      D<sub>10</sub>=  
 C<sub>u</sub>=      C<sub>c</sub>=

**Classification**  
 USCS= SM      AASHTO= A-2-4(0)

**Remarks**  
 Boring jar sampled by Joel Morin 5/10/21  
 See geotechnical report for additional information

Sample No.: S2  
Location: B1

Source of Sample: Geotechnical Borings 5/10/21

Date: 5/12/21  
Elev./Depth: 2'-4'

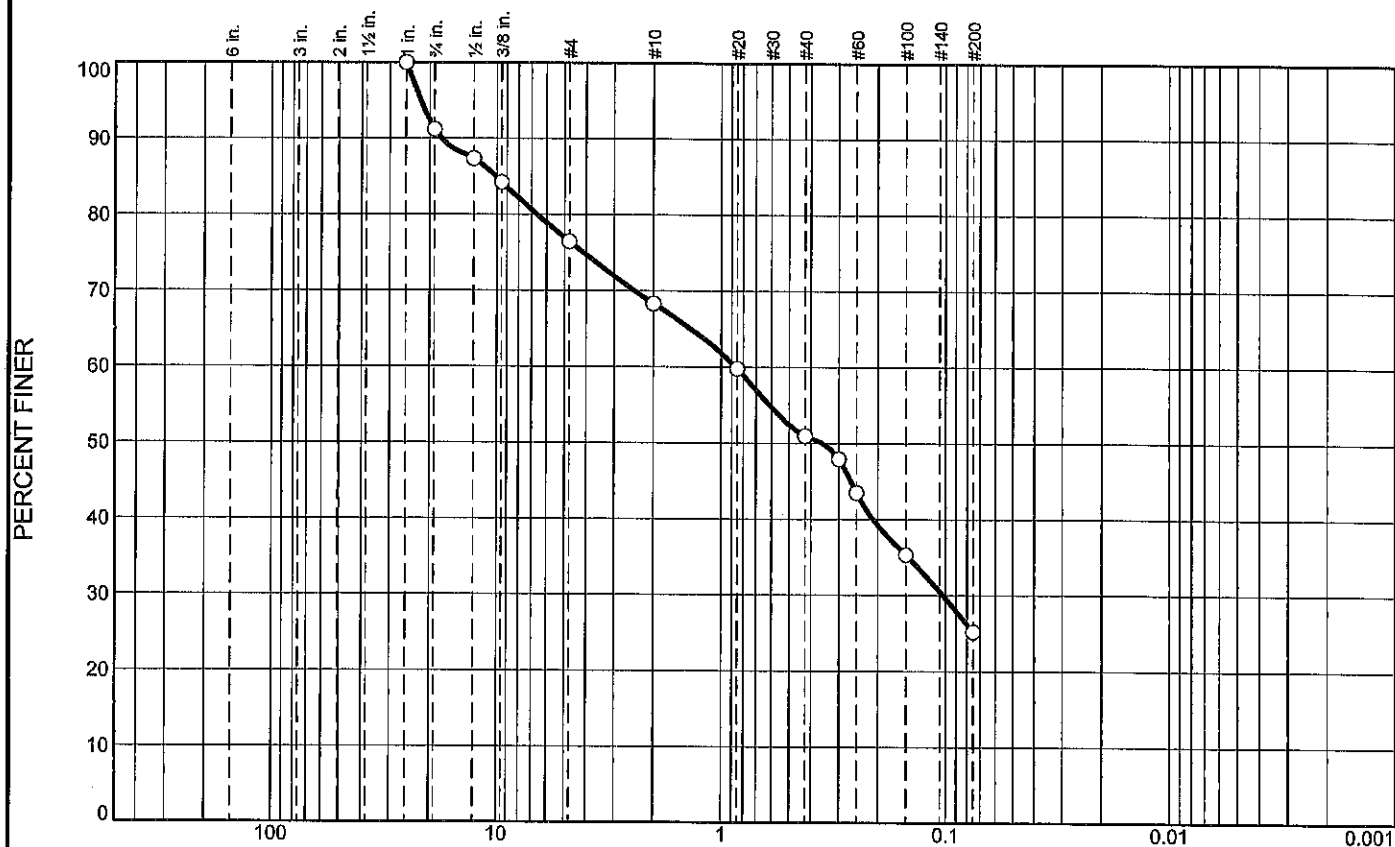
**YANKEE ENGINEERING  
& TESTING, INC.**

Client: Encompass Health  
 Project: Fairlawn Rehabilitation Hospital  
 189 May Street, Worcester, MA  
 Project No: 19103

Tested By: AK

Checked By: SMM

# Particle Size Distribution Report



% +3"

0.0

% Gravel

23.5

% Sand

51.3

% Silt

25.2

% Clay

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	91.2		
1/2"	87.4		
3/8"	84.2		
#4	76.5		
#10	68.3		
#20	59.8		
#40	51.0		
#60	47.9		
#100	35.4		
#200	25.2		

\* (no specification provided)

## Material Description

Light brown SAND some silt some gravel

## Atterberg Limits

PL= NP

LL= NV

PI= NP

## Coefficients

D<sub>85</sub>= 10.1300

D<sub>60</sub>= 0.8626

D<sub>50</sub>= 0.3561

D<sub>30</sub>= 0.1024

D<sub>15</sub>=

D<sub>10</sub>=

C<sub>u</sub>=

C<sub>c</sub>=

## Classification

USCS= SM

AASHTO= A-2-4(0)

## Remarks

Boring jar sampled by Joel Morin 5/10/21

See geotechnical report for additional information

Sample No.: S3

Location: B2

Source of Sample: Geotechnical Borings 5/10/21

Date: 5/12/21

Elev./Depth: 5'-7'

**YANKEE ENGINEERING  
& TESTING, INC.**

Client: Encompass Health

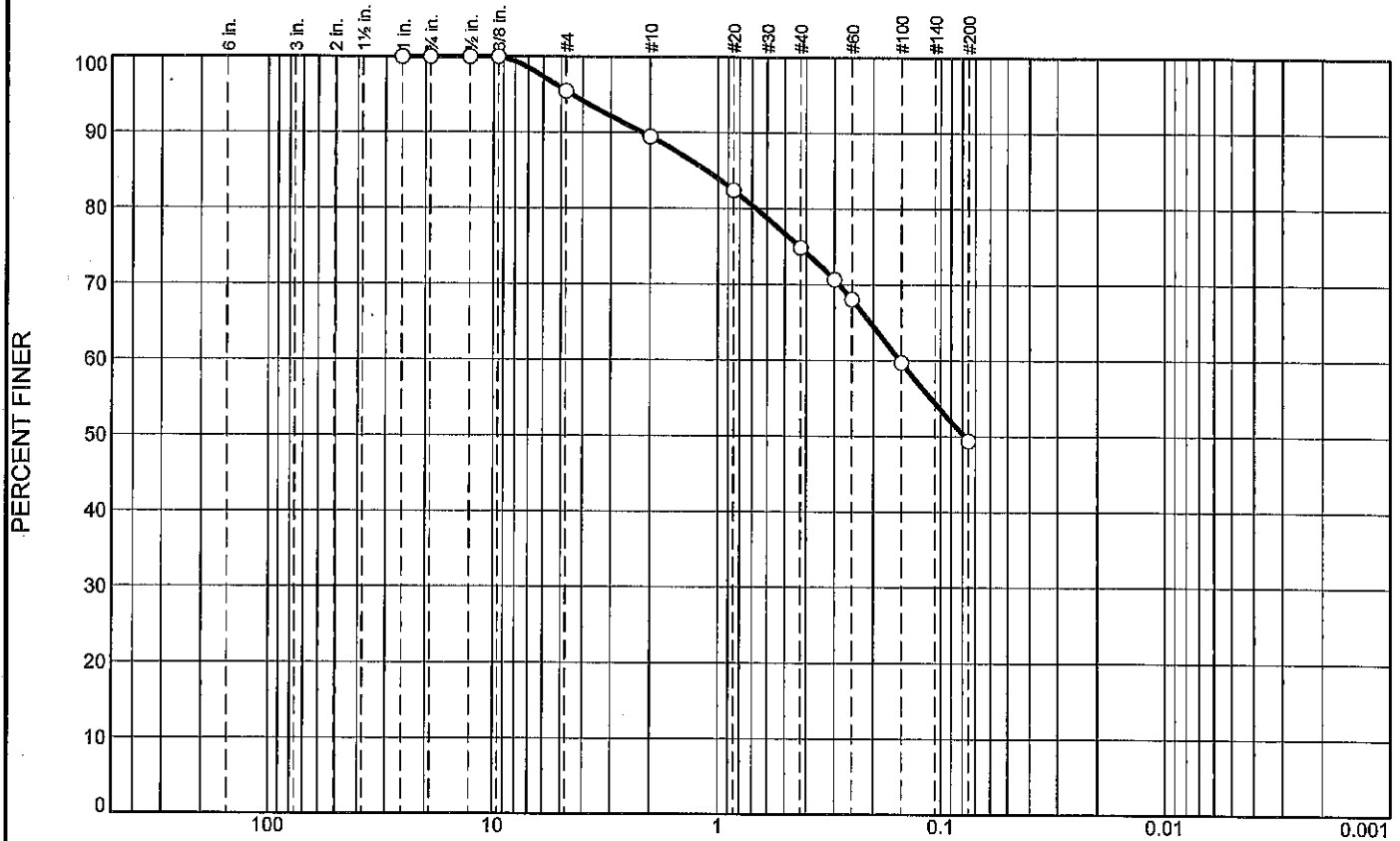
Project: Fairlawn Rehabilitation Hospital  
189 May Street, Worcester, MA

Project No: 19103

Tested By: AK

Checked By: SMM

# Particle Size Distribution Report



GRAIN SIZE - mm.

% +3"	% Gravel	% Sand	% Silt	% Clay
0.0	4.5	46.1	49.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
#4	95.5		
#10	89.5		
#20	82.4		
#40	74.9		
#60	70.7		
#100	59.7		
#200	49.4		

\* (no specification provided)

## Material Description

Brown/gray SILT and SAND trace gravel

## Atterberg Limits

PL= NP LL= NV PI= NP

## Coefficients

D<sub>85</sub>= 1.1254 D<sub>60</sub>= 0.1527 D<sub>50</sub>= 0.0782  
D<sub>30</sub>= C<sub>u</sub>= D<sub>15</sub>= D<sub>10</sub>= C<sub>c</sub>=

## Classification

USCS= SM AASHTO= A-4(0)

## Remarks

Boring jar sampled by Joel Morin 5/10/21  
See geotechnical report for additional information

Sample No.: S6  
Location: B2

Source of Sample: Geotechnical Borings 5/10/21

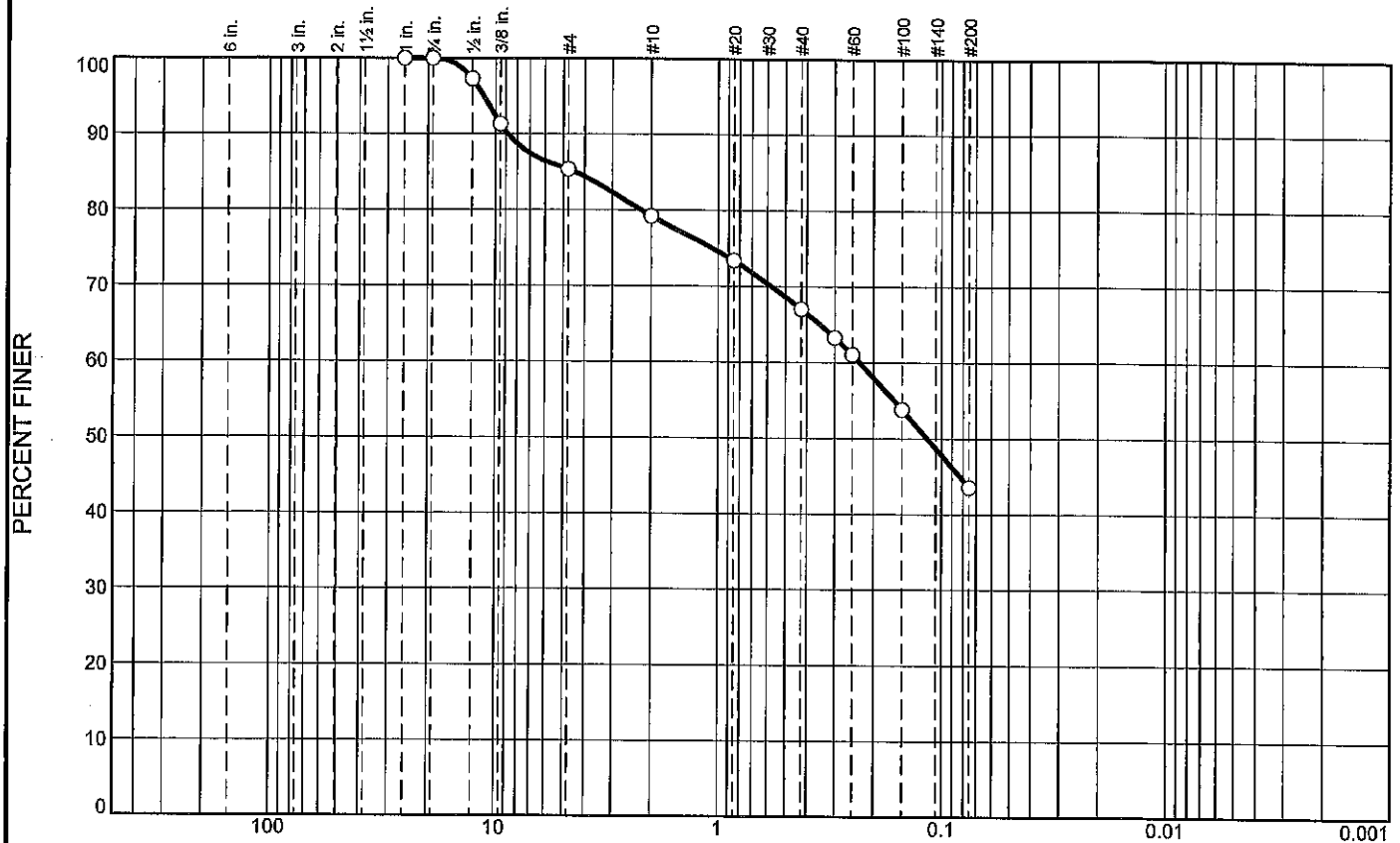
Date: 5/12/21  
Elev./Depth: 15'-17'

**YANKEE ENGINEERING  
& TESTING, INC.**

Client: Encompass Health  
Project: Fairlawn Rehabilitation Hospital  
189 May Street, Worcester, MA  
Project No: 19103

Tested By: AK Checked By: SMM

# Particle Size Distribution Report



% +3"

0.0

% Gravel

14.6

% Sand

41.8

% Silt

43.6

% Clay

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	100.0		
1/2"	97.3		
3/8"	91.3		
#4	85.4		
#10	79.2		
#20	73.4		
#40	67.0		
#50	63.3		
#60	61.0		
#100	53.8		
#200	43.6		

\* (no specification provided)

## Material Description

Brown/red SAND and SILT little gravel

## Atterberg Limits

PL= NP

LL= NV

PI= NP

## Coefficients

D<sub>85</sub>= 4.4144

D<sub>60</sub>= 0.2313

D<sub>50</sub>= 0.1156

D<sub>30</sub>=

D<sub>15</sub>=

D<sub>10</sub>=

C<sub>u</sub>=

C<sub>c</sub>=

## Classification

USCS= SM

AASHTO= A-4(0)

## Remarks

Boring jar sampled by Joel Morin 5/10/21

See geotechnical report for additional information

Sample No.: S7

Location: B3

Source of Sample: Geotechnical Borings 5/10/21

Date: 5/12/21

Elev./Depth: 20'-22'

**YANKEE ENGINEERING  
& TESTING, INC.**

Client: Encompass Health

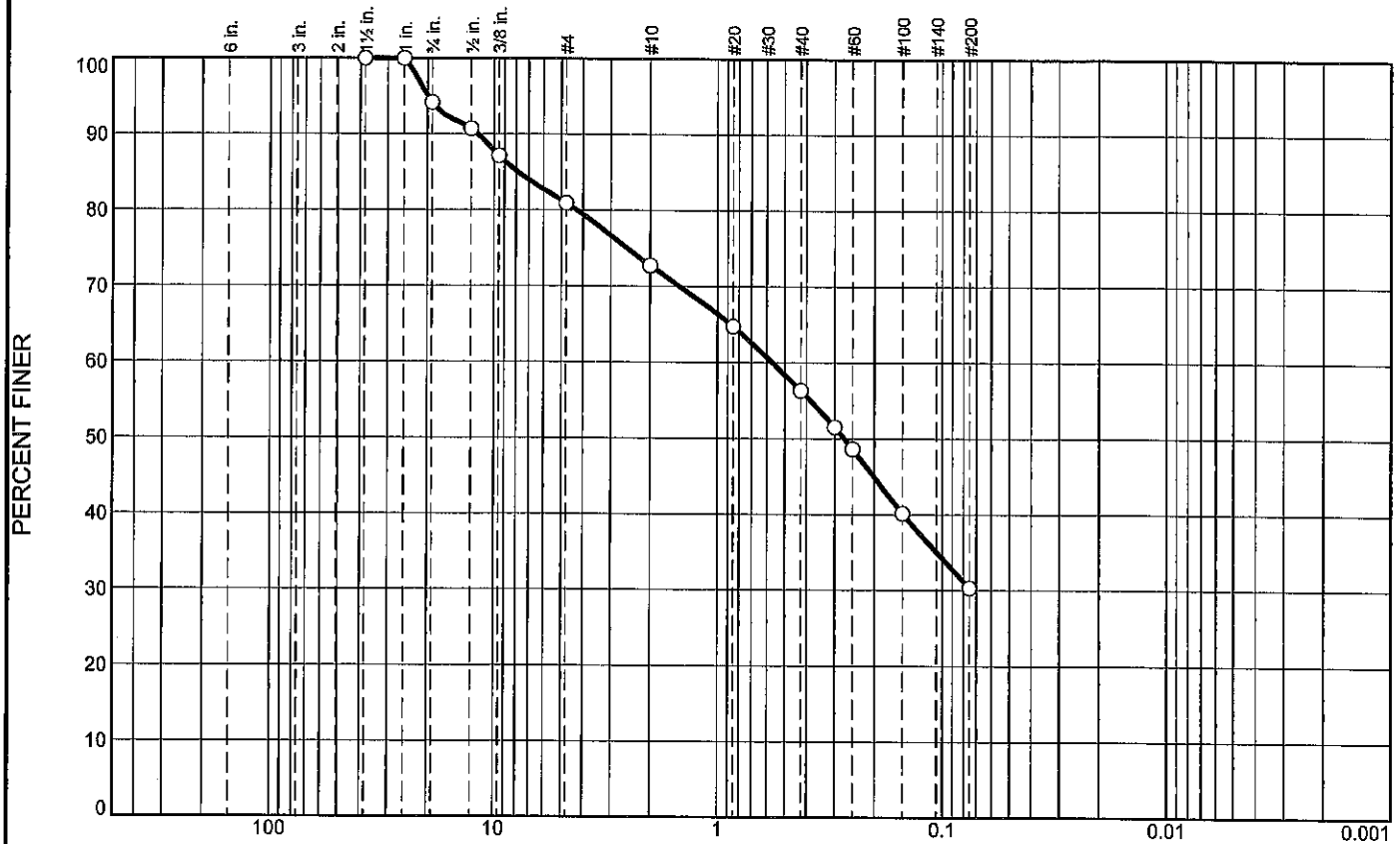
Project: Fairlawn Rehabilitation Hospital  
189 May Street, Worcester, MA

Project No: 19103

Tested By: AK

Checked By: SMM

# Particle Size Distribution Report



% +3"	% Gravel	% Sand	% Silt	% Clay
0.0	19.0	50.7	30.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1-1/2"	100.0		
1"	100.0		
3/4"	94.2		
1/2"	90.7		
3/8"	87.2		
#4	81.0		
#10	72.7		
#20	64.7		
#40	56.3		
#50	51.5		
#60	48.6		
#100	40.2		
#200	30.3		

\* (no specification provided)

## Material Description

Brown SAND some silt little gravel

## Atterberg Limits

PL= NP

LL= NV

PI= NP

## Coefficients

D<sub>85</sub>= 7.8419

D<sub>60</sub>= 0.5667

D<sub>50</sub>= 0.2721

D<sub>30</sub>=

D<sub>15</sub>=

D<sub>10</sub>=

C<sub>u</sub>=

C<sub>c</sub>=

## Classification

USCS= SM

AASHTO= A-2-4(0)

## Remarks

Boring jar sampled by Joel Morin 5/10/21

See geotechnical report for additional information

Sample No.: S2  
Location: B4

Source of Sample: Geotechnical Borings 5/10/21

Date: 5/12/21  
Elev./Depth: 2'-4'

**YANKEE ENGINEERING  
& TESTING, INC.**

Client: Encompass Health  
Project: Fairlawn Rehabilitation Hospital  
189 May Street, Worcester, MA  
Project No: 19103

Tested By: AK Checked By: SMM

**CONSTRUCTION PERIOD (SHORT TERM)**  
**STORMWATER OPERATION & MAINTENANCE PROGRAM**  
September 14, 2021

**Fairlawn Rehabilitation Hospital Addition and Renovations**  
**189 May Street**  
**Worcester, Massachusetts**

Currently Owned by:  
New England Rehabilitation Hospital of Central Massachusetts, Inc.

During construction, the contractor is responsible for the following inspection and maintenance. Inspections and resulting maintenance tasks shall be recorded in an Inspection Log that is kept on site and available for inspection by municipal officials.

**Contact Information:**

Name: To be determined  
Address: \_\_\_\_\_  
Contact: \_\_\_\_\_  
Phone: \_\_\_\_\_

1. Sediment control barriers shall be inspected on a weekly basis. The inspector shall inspect for barriers overturned, barriers which have lost contact with the ground allowing runoff to pass underneath them and biodegradation of straw wattles.
2. If collected silt against the sediment control barriers has reached to half the height of the silt fence then it shall be removed. If a sediment control barrier must be replaced, the inspector shall inform the City, contractor, and owner immediately to have this replacement made as soon as possible.
3. The site entrance mat shall be inspected on a weekly basis and refreshed as necessary.
4. The drainage inlets and outlets shall be inspected on a weekly basis and immediately after storm events of 1/2 inch or more to confirm that they are functioning properly. If any defects are observed or if the inspector shall inform the Engineer, contractor, and owner immediately.
5. The proposed lawn and landscape areas created will be inspected for the presence of rills or other areas of erosion. If areas to be vegetated become bare through either erosion or the failure of vegetation to take, the inspector shall inform the contractor and owner and additional hydroseeding or planting shall be performed, as necessary, to achieve full stabilization through vegetation.
6. If fertilizer is used it must be low in phosphorus and utilize slow-release phosphorus.
7. Pet wastes, food waste, and construction debris must be collected and disposed of, not allowed to biodegrade or enter stormwater runoff.

**POST CONSTRUCTION (LONG TERM)  
STORMWATER OPERATION & MAINTENANCE PROGRAM**

September 14, 2021

**Fairlawn Rehabilitation Hospital  
189 May Street  
Worcester, Massachusetts**

**Post-Construction Owner and Applicant**

**Owner Information:**

Name:	Fairlawn Hospital
Address:	189 May Street, Worcester, MA
Contact:	Josiah Moyer, Facilities Director
Phone:	508-791-6351

Upon completion of the project, the yard and landscaping will continue to be maintained by the future lot owner. Once the construction site has been fully stabilized, the owner should establish a schedule and keep a log of inspection and maintenance activities for the measures described below:

**Landscape Maintenance:**

Vegetated areas in the landscape will reduce erosion, encourage infiltration of rainwater, and keep stormwater clean. It is important to maintain the vegetated areas of the site.

1. Proper mowing is one of the most important ways to maintain a healthy lawn. Mow only when the grass is dry to get a clean cut and minimize the spread of disease. Mow grass to a height of 3". Mow frequently, cutting no more than 1/3 of the height of the grass at a time. Sharpen your mower blades after every 10 hours of mowing.

2. Grass clippings contain high amounts of nitrogen, a key ingredient in fertilizer. Make all attempts to use your grass clippings by leaving them on your lawn. If the grass clippings are not used, do not dispose of them near any wetlands and or water bodies and designate a place to compost them in an upland area.

3. If your lawn areas and plant material demand fertilizer, then use low phosphorus organic or slow-release fertilizers. Fertilize in the fall, but in coordination with weather patterns.

4. The best defense against pests within the grass is to use an Integrated Pest Management system which consists of beneficial insects (lady bugs, spiders, certain nematodes, and bacteria.)

5. Minimize watering the lawn areas. If needed water in the early morning and water deeply and infrequently.

6. Collect and dispose of pet wastes rather than allowing them to be washed off with stormwater runoff.

**Impervious Surface Maintenance:**

Particles that collect on paved surfaces can contain materials that can inhibit water quality. Sweeping sand and debris from the parking lot is a good housekeeping measure that will remove gross pollutants and should be undertaken a minimum of twice per year. DEP recommends frequent sweeping of parking lots in high traffic areas as an integral part of stormwater management.

1. The parking lots shall be swept at least twice a year. Some property owners sweep their sites more frequently to maintain a neat appearance for customers.



2. Accumulated leaves and grass clippings shall also be removed from the impervious surfaces at a minimum of twice per year.
3. In the winter months,  $\text{CaCl}_2$  (calcium chloride salt) application shall be limited to the amount necessary to prevent sand from freezing. Sand shall be used sparingly but in sufficient quantity to maintain the parking and loading surface in a safe condition.

### Catch Basin and Drainage System Maintenance:

The deep sump catch basins remove floatable trash, petroleum products, and sediments from the stormwater in order to prevent them from reaching the waters of the Commonwealth. They must be inspected and cleaned periodically to be sure they are operating properly.

1. Catch basins shall be inspected at a minimum of two times a year (i.e. spring and fall).
2. The visual inspection should ascertain that the traps and deflectors are in place and that there are no blockages or obstructions to the inlet and or trap.
3. If during the inspection, it is noticed that any of the internal components are damaged or missing, they should be repaired immediately.
4. The inspection should also identify evidence of vector infestation (mosquito larvae, for example) and accumulation of hydrocarbons, trash, and sediment in the system.
5. A clamshell truck may be used to clean out catch basins after confirming that there is no oil or fuel floatables present. Disposal of the material from the stormwater BMP sumps shall be in accordance with the local municipality's requirements.
6. Clean the catch basin and hydrodynamic separator during dry weather conditions when no flow is entering the system. Remove debris, sand, and accumulated trash from the unit's interior and remove the fines from the screen.
7. Subsurface structures are confined spaces and only properly trained personnel possessing the proper training and possessing the necessary safety equipment should enter the unit. Confined spaces can contain odorless, colorless poison gas. **Take confined entry precautions seriously.**

### Detention Basin and Open Drainage Swale Maintenance:

Drainage swales and detention basins convey and hold surface stormwater, and their capacity must be maintained regularly to assure proper function to prevent excess runoff and damage to downstream properties.

1. Swales and detention basins should be inspected at a minimum of two times a year (i.e. spring and fall).
2. The visual inspection should ascertain that the slopes are stable, that no erosion and sedimentation is occurring, and the slopes, dikes, and spillways are structurally intact, are that there are no blockages or obstructions to the flow of stormwater.
3. Swales and detention basins shall be mowed at least once per year, and any trees or invasive vegetation should be removed from them on a regular basis. Tree roots can cause structural instability in dikes that are designed to hold water.

## Stormwater Construction Site Inspection Report

General Information			
Project Name	Fairlawn Hospital Addition and Renovation		
NPDES Tracking No.	Not Applicable	Location	189 May Street, Worcester, MA
Date of Inspection		Start/End Time	
Inspector's Name(s)			
Inspector's Title(s)			
Inspector's Contact Information			
Inspector's Qualifications			
Describe present phase of construction			
<b>Type of Inspection:</b> <input type="checkbox"/> Regular <input type="checkbox"/> Pre-storm event <input type="checkbox"/> During storm event <input type="checkbox"/> Post-storm event			
Weather Information			
Has there been a storm event since the last inspection? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, provide: Storm Start Date & Time:                  Storm Duration (hrs):                  Approximate Amount of Precipitation (in):			
<b>Weather at time of this inspection?</b> <input type="checkbox"/> Clear <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain <input type="checkbox"/> Sleet <input type="checkbox"/> Fog <input type="checkbox"/> Snowing <input type="checkbox"/> High Winds <input type="checkbox"/> Other:                                  Temperature:			
Have any discharges occurred since the last inspection? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, describe:			
Are there any discharges at the time of inspection? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, describe:			

### Site-specific BMPs

- Number the structural and non-structural BMPs identified in your SWPPP on your site map and list them below (add as many BMPs as necessary). Carry a copy of the numbered site map with you during your inspections. This list will ensure that you are inspecting all required BMPs at your site.
- Describe corrective actions initiated, date completed, and note the person that completed the work in the Corrective Action Log.

	BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
1	Erosion control barriers	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2	Temp. settling basin, if any	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3	Catch Basin Inlets, if any	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4	Site Entrance Mat, if any	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5	Floc Blocks & Jute Mesh, if used	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
6	Stockpile Protection, if any	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
7	Site Catch Basins and Manholes, if any	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
8	Downstream Discharge	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

	BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
	Point			
9	Slope Stabilization Measures	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
10		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
11		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
12		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
13		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
14		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
15		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
16		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
17		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
18		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
19		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
20		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

### Overall Site Issues

Below are some general site issues that should be assessed during inspections. Customize this list as needed for conditions at your site.

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
1	Are all slopes and disturbed areas not actively being worked properly stabilized?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2	Are natural resource areas (e.g., streams, wetlands, mature trees, etc.) protected with barriers or similar BMPs?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3	Are perimeter controls and sediment barriers adequately installed (keyed into substrate) and maintained?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4	Are discharge points and receiving waters free of any sediment deposits?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5	Are storm drain inlets properly protected?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
6	Is the construction exit preventing sediment from being tracked into the driveway/ street?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
7	Is trash/litter from work areas collected and placed in covered dumpsters?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
8	Are washout facilities (e.g., paint, stucco, concrete) available, clearly marked, and maintained? To prevent the discharge to the ground and watershed?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
9	Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
10	Are materials that are potential stormwater contaminants stored inside or under cover?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
11	Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
12	(Other)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

#### Non-Compliance

Describe any incidents of non-compliance not described above:

#### CERTIFICATION STATEMENT

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Print name and title: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## ANNUAL RECORD OF MAINTENANCE

OWNER: Fairlawn Rehabilitation Hospital

ADDRESS: 189 May Street, Worcester, MA

INSPECTOR: \_\_\_\_\_ PHONE: \_\_\_\_\_

### DEVICES/ AREAS OPERATION AND MAINTENANCE:

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
<b>LANDSCAPING</b> MAINTENANCE PERFORMED												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
<b>IMPERVIOUS SURFACE</b> MAINTENANCE PERFORMED												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
<b>CATCH BASINS</b> MAINTENANCE PERFORMED												

ADDITIONAL NOTES: \_\_\_\_\_  
 \_\_\_\_\_

SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

## ANNUAL RECORD OF INSPECTIONS

OWNER: Fairlawn Rehabilitation Hospital

ADDRESS: 189 May Street Street, Worcester MA

INSPECTOR: \_\_\_\_\_ PHONE: \_\_\_\_\_

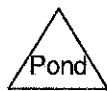
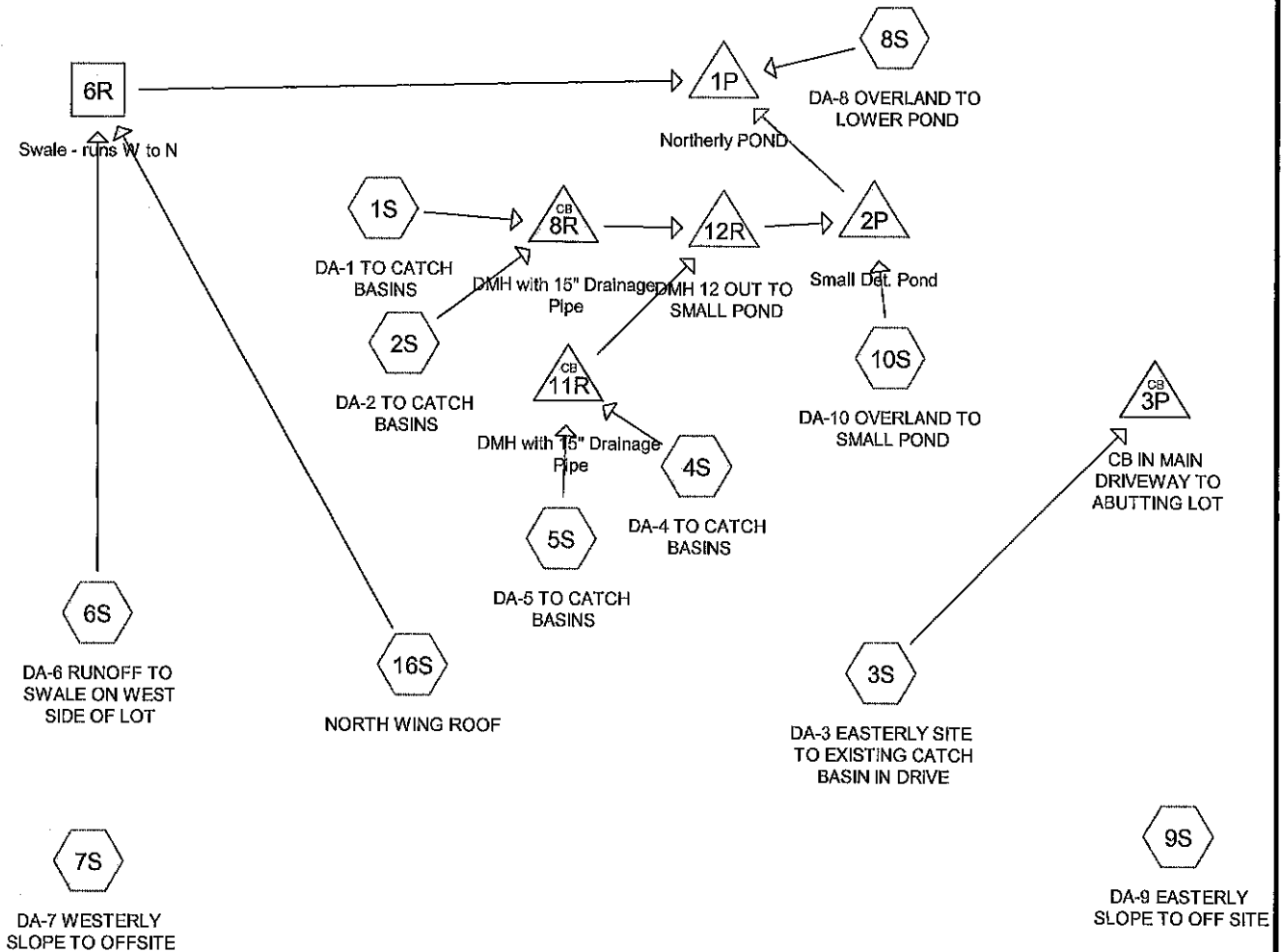
**DEVICES/ AREAS INSPECTED:**

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
LANDSCAPING												
OBSERVATIONS												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
IMPERVIOUS SURFACE												
OBSERVATIONS												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CATCH BASINS												
OBSERVATIONS												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DRAINAGE SWALE												
OBSERVATIONS												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DETENTION BASIN												
OBSERVATIONS												

ADDITIONAL NOTES: \_\_\_\_\_  
 \_\_\_\_\_

SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

# PREDEVELOPMENT



## Routing Diagram for 189 MAY ST Fairlawn PREDEV

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**Summary for Subcatchment 1S: DA-1 TO CATCH BASINS**

Runoff = 0.42 cfs @ 12.13 hrs, Volume= 0.033 af, Depth> 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

Area (sf)	CN	Description
* 7,195	98	impervious
7,195		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 2S: DA-2 TO CATCH BASINS**

Runoff = 0.55 cfs @ 12.13 hrs, Volume= 0.044 af, Depth> 2.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

Area (sf)	CN	Description
* 9,015	98	impervious
* 932	74	hsgC grass, open
9,947	96	Weighted Average
932		9.37% Pervious Area
9,015		90.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 3S: DA-3 EASTERLY SITE TO EXISTING CATCH BASIN IN DRIVE**

Runoff = 2.80 cfs @ 12.14 hrs, Volume= 0.220 af, Depth> 2.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

Area (sf)	CN	Description
* 41,229	98	impervious
* 6,247	74	hsgC grass, open, some mulch
* 4,922	72	hsgC wooded, trees
* 2,258	98	roof
54,656	93	Weighted Average
11,169		20.44% Pervious Area
43,487		79.56% Impervious Area



**189 MAY ST Fairlawn PREDEV**

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Type III 24-hr 2-yr Rainfall=3.14"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 4S: DA-4 TO CATCH BASINS**

Runoff = 0.45 cfs @ 12.14 hrs, Volume= 0.036 af, Depth&gt; 1.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

Area (sf)	CN	Description
* 5,894	98	impervious
* 5,182	74	hsgC grass, open
11,076	87	Weighted Average
5,182		46.79% Pervious Area
5,894		53.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 5S: DA-5 TO CATCH BASINS**

Runoff = 1.73 cfs @ 12.13 hrs, Volume= 0.137 af, Depth&gt; 2.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

Area (sf)	CN	Description
* 28,942	98	impervious
* 1,482	74	hsgC grass, open
30,424	97	Weighted Average
1,482		4.87% Pervious Area
28,942		95.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 6S: DA-6 RUNOFF TO SWALE ON WEST SIDE OF LOT**

Runoff = 4.68 cfs @ 12.15 hrs, Volume= 0.375 af, Depth&gt; 1.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 2-yr Rainfall=3.14"

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	Area (sf)	CN	Description
*	44,913	98	impervious
*	72,726	72	hsgC wooded, trees
*	12,925	98	roof
	130,564	84	Weighted Average
	72,726		55.70% Pervious Area
	57,838		44.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 7S: DA-7 WESTERLY SLOPE TO OFFSITE**

Runoff = 0.82 cfs @ 12.15 hrs, Volume= 0.065 af, Depth&gt; 1.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

	Area (sf)	CN	Description
*	9,091	98	impervious
*	13,655	74	hsgC grass, open
	22,746	84	Weighted Average
	13,655		60.03% Pervious Area
	9,091		39.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 8S: DA-8 OVERLAND TO LOWER POND**

Runoff = 0.10 cfs @ 12.13 hrs, Volume= 0.008 af, Depth&gt; 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

	Area (sf)	CN	Description
*	1,702	98	impervious
	1,702		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 2-yr Rainfall=3.14"

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**Summary for Subcatchment 9S: DA-9 EASTERLY SLOPE TO OFF SITE**

Runoff = 0.65 cfs @ 12.17 hrs, Volume= 0.056 af, Depth&gt; 0.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

	Area (sf)	CN	Description
*	1,737	98	impervious
*	13,161	74	hsgC grass, open
*	17,161	72	hsgC wooded, trees
	32,059	74	Weighted Average
	30,322		94.58% Pervious Area
	1,737		5.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 10S: DA-10 OVERLAND TO SMALL POND**

Runoff = 0.08 cfs @ 12.17 hrs, Volume= 0.007 af, Depth&gt; 0.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

	Area (sf)	CN	Description
*	3,852	74	hsgC grass, open
	3,852		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 16S: NORTH WING ROOF**

Runoff = 0.75 cfs @ 12.13 hrs, Volume= 0.059 af, Depth&gt; 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

	Area (sf)	CN	Description
*	12,979	98	roof
	12,979		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**189 MAY ST Fairlawn PREDEV**

Prepared by THOMPSON-LISTON Associates, Inc.

Type III 24-hr 2-yr Rainfall=3.14"

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**Summary for Reach 6R: Swale - runs W to N**

Inflow Area = 3.295 ac, 49.34% Impervious, Inflow Depth > 1.58" for 2-yr event  
 Inflow = 5.42 cfs @ 12.14 hrs, Volume= 0.434 af  
 Outflow = 5.32 cfs @ 12.19 hrs, Volume= 0.433 af, Atten= 2%, Lag= 2.9 min

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Max. Velocity= 3.38 fps, Min. Travel Time= 2.5 min

Avg. Velocity= 1.29 fps, Avg. Travel Time= 6.4 min

Peak Storage= 787 cf @ 12.19 hrs

Average Depth at Peak Storage= 0.31'

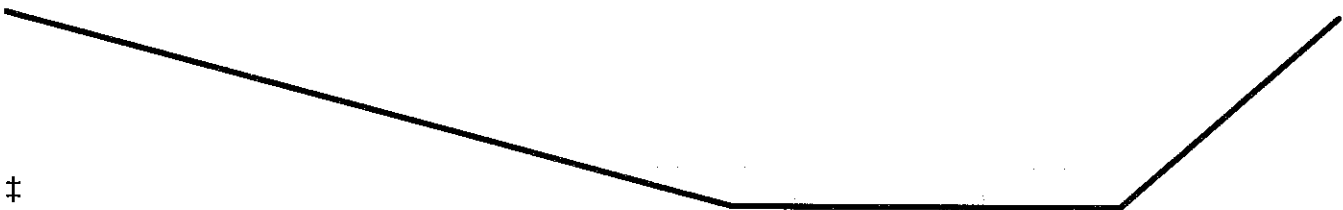
Bank-Full Depth= 1.50' Flow Area= 13.3 sf, Capacity= 106.43 cfs

4.00' x 1.50' deep channel, n= 0.025

Side Slope Z-value= 5.0 1.5 ' Top Width= 13.75'

Length= 500.0' Slope= 0.0200 ' /'

Inlet Invert= 573.00', Outlet Invert= 563.00'

**Summary for Pond 1P: Northerly POND**

Inflow Area = 4.769 ac, 59.48% Impervious, Inflow Depth > 1.75" for 2-yr event  
 Inflow = 8.56 cfs @ 12.19 hrs, Volume= 0.697 af  
 Outflow = 8.83 cfs @ 12.20 hrs, Volume= 0.604 af, Atten= 0%, Lag= 0.9 min  
 Discarded = 0.06 cfs @ 12.20 hrs, Volume= 0.042 af  
 Primary = 8.77 cfs @ 12.20 hrs, Volume= 0.562 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 562.98' @ 12.20 hrs Surf.Area= 2,561 sf Storage= 4,476 cf

Plug-Flow detention time= 58.7 min calculated for 0.604 af (87% of inflow)

Center-of-Mass det. time= 19.1 min ( 812.2 - 793.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	559.44'	7,541 cf	<b>Northerly Pond from Swale (Prismatic) Listed below (Recalc)</b>

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
559.44	0	0	0
560.00	431	121	121
562.00	1,819	2,250	2,371
562.79	2,337	1,642	4,012
563.00	2,585	517	4,529
564.00	3,438	3,012	7,541

**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 2-yr Rainfall=3.14"

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Device	Routing	Invert	Outlet Devices
#1	Primary	562.78'	<b>40.0' long x 9.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.46 2.55 2.70 2.69 2.68 2.68 2.67 2.64 2.64 2.64 2.65 2.64 2.65 2.65 2.66 2.67 2.69
#2	Primary	563.30'	<b>40.0' long (Profile 29) Broad-Crested Rectangular Weir</b> Head (feet) 0.49 0.98 1.48 Coef. (English) 3.48 3.50 3.48
#3	Discarded	559.44'	<b>1.020 in/hr Exfiltration over Horizontal area</b>

**Discarded OutFlow** Max=0.06 cfs @ 12.20 hrs HW=562.98' (Free Discharge)

└─3=Exfiltration (Exfiltration Controls 0.06 cfs)

**Primary OutFlow** Max=8.72 cfs @ 12.20 hrs HW=562.98' (Free Discharge)

└─1=Broad-Crested Rectangular Weir (Weir Controls 8.72 cfs @ 1.10 fps)

└─2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

**Summary for Pond 2P: Small Det. Pond**

Inflow Area = 1.435 ac, 81.68% Impervious, Inflow Depth > 2.14" for 2-yr event  
 Inflow = 3.15 cfs @ 12.17 hrs, Volume= 0.256 af  
 Outflow = 3.15 cfs @ 12.18 hrs, Volume= 0.256 af, Atten= 0%, Lag= 0.5 min  
 Primary = 3.15 cfs @ 12.18 hrs, Volume= 0.256 af  
 Secondary = 0.00 cfs @ 10.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 577.40' @ 12.18 hrs Surf.Area= 77 sf Storage= 49 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 0.2 min ( 782.0 - 781.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	576.21'	457 cf	<b>Small Detention Pond (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
576.21	0	0	0
577.00	56	22	22
578.00	108	82	104
579.00	162	135	239
580.00	273	218	457

Device	Routing	Invert	Outlet Devices
#1	Primary	576.21'	<b>12.0" Round Culvert to Large Pond</b> L= 49.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 576.21' / 575.71' S= 0.0102 ' S= 0.0102 ' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	579.00'	<b>120.0 deg x 5.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir</b> Cv= 2.48 (C= 3.10)

**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 2-yr Rainfall=3.14"

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**Primary OutFlow** Max=3.06 cfs @ 12.18 hrs HW=577.36' TW=562.97' (Dynamic Tailwater)↑**1=Culvert to Large Pond** (Inlet Controls 3.06 cfs @ 3.89 fps)**Secondary OutFlow** Max=0.00 cfs @ 10.00 hrs HW=576.38' TW=559.69' (Dynamic Tailwater)↑**2=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)**Summary for Pond 3P: CB IN MAIN DRIVEWAY TO ABUTTING LOT**

Inflow Area = 1.255 ac, 79.56% Impervious, Inflow Depth > 2.11" for 2-yr event  
 Inflow = 2.80 cfs @ 12.14 hrs, Volume= 0.220 af  
 Outflow = 2.80 cfs @ 12.14 hrs, Volume= 0.220 af, Atten= 0%, Lag= 0.0 min  
 Primary = 2.80 cfs @ 12.14 hrs, Volume= 0.220 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 578.04' @ 12.13 hrs

Flood Elev= 584.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	577.00'	<b>12.0" Round Culvert</b> L= 68.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 577.00' / 571.56' S= 0.0800 ' S= 0.0800 ' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

**Primary OutFlow** Max=2.65 cfs @ 12.14 hrs HW=577.99' (Free Discharge)↑**1=Culvert** (Inlet Controls 2.65 cfs @ 3.38 fps)**Summary for Pond 8R: DMH with 15" Drainage Pipe**

Inflow Area = 0.394 ac, 94.56% Impervious, Inflow Depth > 2.34" for 2-yr event  
 Inflow = 0.97 cfs @ 12.13 hrs, Volume= 0.077 af  
 Outflow = 0.97 cfs @ 12.13 hrs, Volume= 0.077 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.97 cfs @ 12.13 hrs, Volume= 0.077 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 580.88' @ 12.17 hrs

Flood Elev= 585.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	580.38'	<b>15.0" Round Culvert</b> L= 95.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 580.38' / 579.36' S= 0.0107 ' S= 0.0107 ' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=0.80 cfs @ 12.13 hrs HW=580.86' TW=580.32' (Dynamic Tailwater)↑**1=Culvert** (Outlet Controls 0.80 cfs @ 2.72 fps)

**189 MAY ST Fairlawn PREDEV**

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Type III 24-hr 2-yr Rainfall=3.14"

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**Summary for Pond 11R: DMH with 15" Drainage Pipe**

Inflow Area = 0.953 ac, 83.94% Impervious, Inflow Depth > 2.18" for 2-yr event  
 Inflow = 2.18 cfs @ 12.14 hrs, Volume= 0.173 af  
 Outflow = 2.18 cfs @ 12.14 hrs, Volume= 0.173 af, Atten= 0%, Lag= 0.0 min  
 Primary = 2.18 cfs @ 12.14 hrs, Volume= 0.173 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 581.92' @ 12.14 hrs

Flood Elev= 586.35'

Device	Routing	Invert	Outlet Devices
#1	Primary	581.06'	<b>15.0" Round Culvert</b> L= 177.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 581.06' / 580.39' S= 0.0038 ' S= 0.0038 ' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=2.06 cfs @ 12.14 hrs HW=581.89' TW=580.32' (Dynamic Tailwater)

1=Culvert (Barrel Controls 2.06 cfs @ 3.36 fps)

**Summary for Pond 12R: DMH 12 OUT TO SMALL POND**

Inflow Area = 1.346 ac, 87.05% Impervious, Inflow Depth > 2.22" for 2-yr event  
 Inflow = 3.15 cfs @ 12.13 hrs, Volume= 0.249 af  
 Outflow = 3.08 cfs @ 12.17 hrs, Volume= 0.249 af, Atten= 2%, Lag= 2.2 min  
 Primary = 3.08 cfs @ 12.17 hrs, Volume= 0.249 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 580.36' @ 12.17 hrs Surf.Area= 321 sf Storage= 175 cf

Flood Elev= 586.31' Surf.Area= 25 sf Storage= 496 cf

Plug-Flow detention time= 1.0 min calculated for 0.249 af (100% of inflow)

Center-of-Mass det. time= 0.7 min ( 780.8 - 780.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	579.36'	87 cf	<b>4.00'D x 6.95'H Vertical Cone/Cylinder</b>
#2	579.36'	217 cf	<b>15.0" Round Pipe Storage</b> L= 177.0' S= 0.0038 ' S= 0.0038 ' Cc= 0.900
#3	579.36'	117 cf	<b>15.0" Round Pipe Storage</b> L= 95.0' S= 0.0107 ' S= 0.0107 ' Cc= 0.900
#4	580.39'	78 cf	<b>4.00'D x 6.23'H Vertical Cone/Cylinder</b>
		499 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	579.36'	<b>15.0" Round Culvert</b> L= 61.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 579.36' / 578.98' S= 0.0062 ' S= 0.0062 ' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=2.95 cfs @ 12.17 hrs HW=580.34' TW=577.35' (Dynamic Tailwater)

1=Culvert (Barrel Controls 2.95 cfs @ 3.95 fps)

**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 10-yr Rainfall=4.87"

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**Summary for Subcatchment 1S: DA-1 TO CATCH BASINS**

Runoff = 0.65 cfs @ 12.13 hrs, Volume= 0.052 af, Depth&gt; 3.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

Area (sf)	CN	Description
* 7,195	98	impervious
7,195		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 2S: DA-2 TO CATCH BASINS**

Runoff = 0.88 cfs @ 12.13 hrs, Volume= 0.070 af, Depth&gt; 3.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

Area (sf)	CN	Description
* 9,015	98	impervious
* 932	74	hsgC grass, open
9,947	96	Weighted Average
932		9.37% Pervious Area
9,015		90.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 3S: DA-3 EASTERLY SITE TO EXISTING CATCH BASIN IN DRIVE**

Runoff = 4.65 cfs @ 12.13 hrs, Volume= 0.366 af, Depth&gt; 3.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

Area (sf)	CN	Description
* 41,229	98	impervious
* 6,247	74	hsgC grass, open, some mulch
* 4,922	72	hsgC wooded, trees
* 2,258	98	roof
54,656	93	Weighted Average
11,169		20.44% Pervious Area
43,487		79.56% Impervious Area



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Type III 24-hr 10-yr Rainfall=4.87"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 4S: DA-4 TO CATCH BASINS**

Runoff = 0.83 cfs @ 12.14 hrs, Volume= 0.065 af, Depth&gt; 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

Area (sf)	CN	Description
* 5,894	98	impervious
* 5,182	74	hsgC grass, open
11,076	87	Weighted Average
5,182		46.79% Pervious Area
5,894		53.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 5S: DA-5 TO CATCH BASINS**

Runoff = 2.73 cfs @ 12.13 hrs, Volume= 0.216 af, Depth&gt; 3.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

Area (sf)	CN	Description
* 28,942	98	impervious
* 1,482	74	hsgC grass, open
30,424	97	Weighted Average
1,482		4.87% Pervious Area
28,942		95.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 6S: DA-6 RUNOFF TO SWALE ON WEST SIDE OF LOT**

Runoff = 9.02 cfs @ 12.14 hrs, Volume= 0.713 af, Depth&gt; 2.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

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Type III 24-hr 10-yr Rainfall=4.87"

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	Area (sf)	CN	Description
*	44,913	98	impervious
*	72,726	72	hsgC wooded, trees
*	12,925	98	roof
	130,564	84	Weighted Average
	72,726		55.70% Pervious Area
	57,838		44.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 7S: DA-7 WESTERLY SLOPE TO OFFSITE**

Runoff = 1.57 cfs @ 12.14 hrs, Volume= 0.124 af, Depth&gt; 2.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

	Area (sf)	CN	Description
*	9,091	98	impervious
*	13,655	74	hsgC grass, open
	22,746	84	Weighted Average
	13,655		60.03% Pervious Area
	9,091		39.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 8S: DA-8 OVERLAND TO LOWER POND**

Runoff = 0.15 cfs @ 12.13 hrs, Volume= 0.012 af, Depth&gt; 3.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

	Area (sf)	CN	Description
*	1,702	98	impervious
	1,702		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

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Type III 24-hr 10-yr Rainfall=4.87"

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**Summary for Subcatchment 9S: DA-9 EASTERLY SLOPE TO OFF SITE**

Runoff = 1.58 cfs @ 12.15 hrs, Volume= 0.128 af, Depth&gt; 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

	Area (sf)	CN	Description
*	1,737	98	impervious
*	13,161	74	hsgC grass, open
*	17,161	72	hsgC wooded, trees
	32,059	74	Weighted Average
	30,322		94.58% Pervious Area
	1,737		5.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 10S: DA-10 OVERLAND TO SMALL POND**

Runoff = 0.19 cfs @ 12.15 hrs, Volume= 0.015 af, Depth&gt; 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

	Area (sf)	CN	Description
*	3,852	74	hsgC grass, open
	3,852		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 16S: NORTH WING ROOF**

Runoff = 1.17 cfs @ 12.13 hrs, Volume= 0.093 af, Depth&gt; 3.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

	Area (sf)	CN	Description
*	12,979	98	roof
	12,979		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Reach 6R: Swale - runs W to N**

Inflow Area = 3.295 ac, 49.34% Impervious, Inflow Depth > 2.94" for 10-yr event  
 Inflow = 10.19 cfs @ 12.14 hrs, Volume= 0.806 af  
 Outflow = 9.99 cfs @ 12.18 hrs, Volume= 0.804 af, Atten= 2%, Lag= 2.6 min

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Max. Velocity= 4.11 fps, Min. Travel Time= 2.0 min

Avg. Velocity= 1.62 fps, Avg. Travel Time= 5.2 min

Peak Storage= 1,213 cf @ 12.18 hrs

Average Depth at Peak Storage= 0.45'

Bank-Full Depth= 1.50' Flow Area= 13.3 sf, Capacity= 106.43 cfs

4.00' x 1.50' deep channel, n= 0.025

Side Slope Z-value= 5.0 1.5 '/' Top Width= 13.75'

Length= 500.0' Slope= 0.0200 '/'

Inlet Invert= 573.00', Outlet Invert= 563.00'

**Summary for Pond 1P: Northerly POND**

Inflow Area = 4.769 ac, 59.48% Impervious, Inflow Depth > 3.11" for 10-yr event  
 Inflow = 15.21 cfs @ 12.19 hrs, Volume= 1.234 af  
 Outflow = 15.27 cfs @ 12.20 hrs, Volume= 1.142 af, Atten= 0%, Lag= 0.6 min  
 Discarded = 0.06 cfs @ 12.20 hrs, Volume= 0.044 af  
 Primary = 15.21 cfs @ 12.20 hrs, Volume= 1.098 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 563.07' @ 12.20 hrs Surf.Area= 2,641 sf Storage= 4,699 cf

Plug-Flow detention time= 38.1 min calculated for 1.141 af (92% of inflow)

Center-of-Mass det. time= 12.4 min ( 799.8 - 787.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	559.44'	7,541 cf	Northerly Pond from Swale (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
559.44	0	0	0
560.00	431	121	121
562.00	1,819	2,250	2,371
562.79	2,337	1,642	4,012
563.00	2,585	517	4,529
564.00	3,438	3,012	7,541

**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 10-yr Rainfall=4.87"

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Device	Routing	Invert	Outlet Devices
#1	Primary	562.78'	<b>40.0' long x 9.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.46 2.55 2.70 2.69 2.68 2.68 2.67 2.64 2.64 2.64 2.65 2.64 2.65 2.65 2.66 2.67 2.69
#2	Primary	563.30'	<b>40.0' long (Profile 29) Broad-Crested Rectangular Weir</b> Head (feet) 0.49 0.98 1.48 Coef. (English) 3.48 3.50 3.48
#3	Discarded	559.44'	<b>1.020 in/hr Exfiltration over Horizontal area</b>

**Discarded OutFlow** Max=0.06 cfs @ 12.20 hrs HW=563.06' (Free Discharge)  
 ↳ **3=Exfiltration** (Exfiltration Controls 0.06 cfs)

**Primary OutFlow** Max=15.06 cfs @ 12.20 hrs HW=563.06' (Free Discharge)  
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 15.06 cfs @ 1.33 fps)  
 ↳ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

**Summary for Pond 2P: Small Det. Pond**

Inflow Area = 1.435 ac, 81.68% Impervious, Inflow Depth > 3.50" for 10-yr event  
 Inflow = 5.16 cfs @ 12.17 hrs, Volume= 0.418 af  
 Outflow = 5.07 cfs @ 12.19 hrs, Volume= 0.418 af, Atten= 2%, Lag= 1.1 min  
 Primary = 5.07 cfs @ 12.19 hrs, Volume= 0.418 af  
 Secondary = 0.00 cfs @ 10.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Peak Elev= 578.53' @ 12.19 hrs Surf.Area= 137 sf Storage= 169 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 0.2 min ( 780.0 - 779.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	576.21'	457 cf	<b>Small Detention Pond (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
576.21	0	0	0
577.00	56	22	22
578.00	108	82	104
579.00	162	135	239
580.00	273	218	457

Device	Routing	Invert	Outlet Devices
#1	Primary	576.21'	<b>12.0" Round Culvert to Large Pond</b> L= 49.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 576.21' / 575.71' S= 0.0102' /' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	579.00'	<b>120.0 deg x 5.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir</b> Cv= 2.48 (C= 3.10)

**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 10-yr Rainfall=4.87"

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**Primary OutFlow** Max=4.99 cfs @ 12.19 hrs HW=578.47' TW=563.06' (Dynamic Tailwater)↑**1=Culvert to Large Pond** (Barrel Controls 4.99 cfs @ 6.36 fps)**Secondary OutFlow** Max=0.00 cfs @ 10.00 hrs HW=576.43' TW=559.80' (Dynamic Tailwater)↑**2=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)**Summary for Pond 3P: CB IN MAIN DRIVEWAY TO ABUTTING LOT**

Inflow Area = 1.255 ac, 79.56% Impervious, Inflow Depth > 3.50" for 10-yr event  
 Inflow = 4.65 cfs @ 12.13 hrs, Volume= 0.366 af  
 Outflow = 4.65 cfs @ 12.13 hrs, Volume= 0.366 af, Atten= 0%, Lag= 0.0 min  
 Primary = 4.65 cfs @ 12.13 hrs, Volume= 0.366 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 578.98' @ 12.13 hrs

Flood Elev= 584.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	577.00'	<b>12.0" Round Culvert</b> L= 68.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 577.00' / 571.56' S= 0.0800 ' S= 0.0800 ' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

**Primary OutFlow** Max=4.40 cfs @ 12.13 hrs HW=578.86' (Free Discharge)↑**1=Culvert** (Inlet Controls 4.40 cfs @ 5.61 fps)**Summary for Pond 8R: DMH with 15" Drainage Pipe**

Inflow Area = 0.394 ac, 94.56% Impervious, Inflow Depth > 3.70" for 10-yr event  
 Inflow = 1.53 cfs @ 12.13 hrs, Volume= 0.121 af  
 Outflow = 1.53 cfs @ 12.13 hrs, Volume= 0.121 af, Atten= 0%, Lag= 0.0 min  
 Primary = 1.53 cfs @ 12.13 hrs, Volume= 0.121 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 581.10' @ 12.21 hrs

Flood Elev= 585.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	580.38'	<b>15.0" Round Culvert</b> L= 95.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 580.38' / 579.36' S= 0.0107 ' S= 0.0107 ' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=1.09 cfs @ 12.13 hrs HW=581.04' TW=580.71' (Dynamic Tailwater)↑**1=Culvert** (Outlet Controls 1.09 cfs @ 2.39 fps)

**Summary for Pond 11R: DMH with 15" Drainage Pipe**

Inflow Area = 0.953 ac, 83.94% Impervious, Inflow Depth > 3.55" for 10-yr event  
 Inflow = 3.55 cfs @ 12.13 hrs, Volume= 0.282 af  
 Outflow = 3.55 cfs @ 12.13 hrs, Volume= 0.282 af, Atten= 0%, Lag= 0.0 min  
 Primary = 3.55 cfs @ 12.13 hrs, Volume= 0.282 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 582.24' @ 12.13 hrs

Flood Elev= 586.35'

Device	Routing	Invert	Outlet Devices
#1	Primary	581.06'	<b>15.0" Round Culvert</b> L= 177.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 581.06' / 580.39' S= 0.0038 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=3.37 cfs @ 12.13 hrs HW=582.20' TW=580.71' (Dynamic Tailwater)

↑1=Culvert (Barrel Controls 3.37 cfs @ 3.77 fps)

**Summary for Pond 12R: DMH 12 OUT TO SMALL POND**

Inflow Area = 1.346 ac, 87.05% Impervious, Inflow Depth > 3.59" for 10-yr event  
 Inflow = 5.09 cfs @ 12.13 hrs, Volume= 0.403 af  
 Outflow = 4.97 cfs @ 12.17 hrs, Volume= 0.403 af, Atten= 2%, Lag= 2.2 min  
 Primary = 4.97 cfs @ 12.17 hrs, Volume= 0.403 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 580.79' @ 12.17 hrs Surf.Area= 224 sf Storage= 303 cf

Flood Elev= 586.31' Surf.Area= 25 sf Storage= 496 cf

Plug-Flow detention time= 1.1 min calculated for 0.399 af (99% of inflow)

Center-of-Mass det. time= 0.7 min ( 778.9 - 778.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	579.36'	87 cf	<b>4.00'D x 6.95'H Vertical Cone/Cylinder</b>
#2	579.36'	217 cf	<b>15.0" Round Pipe Storage</b> L= 177.0' S= 0.0038 '/'
#3	579.36'	117 cf	<b>15.0" Round Pipe Storage</b> L= 95.0' S= 0.0107 '/'
#4	580.39'	78 cf	<b>4.00'D x 6.23'H Vertical Cone/Cylinder</b>
		499 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	579.36'	<b>15.0" Round Culvert</b> L= 61.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 579.36' / 578.98' S= 0.0062 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=4.78 cfs @ 12.17 hrs HW=580.74' TW=578.38' (Dynamic Tailwater)

↑1=Culvert (Barrel Controls 4.78 cfs @ 4.38 fps)

**189 MAY ST Fairlawn PREDEV**

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Type III 24-hr 25-yr Rainfall=5.95"

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**Summary for Subcatchment 1S: DA-1 TO CATCH BASINS**

Runoff = 0.80 cfs @ 12.13 hrs, Volume= 0.063 af, Depth&gt; 4.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

Area (sf)	CN	Description
* 7,195	98	impervious
7,195		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 2S: DA-2 TO CATCH BASINS**

Runoff = 1.09 cfs @ 12.13 hrs, Volume= 0.086 af, Depth&gt; 4.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

Area (sf)	CN	Description
* 9,015	98	impervious
* 932	74	hsgC grass, open
9,947	96	Weighted Average
932		9.37% Pervious Area
9,015		90.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 3S: DA-3 EASTERLY SITE TO EXISTING CATCH BASIN IN DRIVE**

Runoff = 5.78 cfs @ 12.13 hrs, Volume= 0.457 af, Depth&gt; 4.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

Area (sf)	CN	Description
* 41,229	98	impervious
* 6,247	74	hsgC grass, open, some mulch
* 4,922	72	hsgC wooded, trees
* 2,258	98	roof
54,656	93	Weighted Average
11,169		20.44% Pervious Area
43,487		79.56% Impervious Area



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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 4S: DA-4 TO CATCH BASINS**

Runoff = 1.06 cfs @ 12.14 hrs, Volume= 0.084 af, Depth&gt; 3.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

Area (sf)	CN	Description
* 5,894	98	impervious
* 5,182	74	hsgC grass, open
11,076	87	Weighted Average
5,182		46.79% Pervious Area
5,894		53.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 5S: DA-5 TO CATCH BASINS**

Runoff = 3.35 cfs @ 12.13 hrs, Volume= 0.266 af, Depth&gt; 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

Area (sf)	CN	Description
* 28,942	98	impervious
* 1,482	74	hsgC grass, open
30,424	97	Weighted Average
1,482		4.87% Pervious Area
28,942		95.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 6S: DA-6 RUNOFF TO SWALE ON WEST SIDE OF LOT**

Runoff = 11.79 cfs @ 12.14 hrs, Volume= 0.930 af, Depth&gt; 3.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

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	Area (sf)	CN	Description
*	44,913	98	impervious
*	72,726	72	hsgC wooded, trees
*	12,925	98	roof
	130,564	84	Weighted Average
	72,726		55.70% Pervious Area
	57,838		44.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 7S: DA-7 WESTERLY SLOPE TO OFFSITE**

Runoff = 2.05 cfs @ 12.14 hrs, Volume= 0.162 af, Depth&gt; 3.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

	Area (sf)	CN	Description
*	9,091	98	impervious
*	13,655	74	hsgC grass, open
	22,746	84	Weighted Average
	13,655		60.03% Pervious Area
	9,091		39.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 8S: DA-8 OVERLAND TO LOWER POND**

Runoff = 0.19 cfs @ 12.13 hrs, Volume= 0.015 af, Depth&gt; 4.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

	Area (sf)	CN	Description
*	1,702	98	impervious
	1,702		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

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**Summary for Subcatchment 9S: DA-9 EASTERLY SLOPE TO OFF SITE**

Runoff = 2.21 cfs @ 12.15 hrs, Volume= 0.177 af, Depth&gt; 2.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

	Area (sf)	CN	Description
*	1,737	98	impervious
*	13,161	74	hsgC grass, open
*	17,161	72	hsgC wooded, trees
	32,059	74	Weighted Average
	30,322		94.58% Pervious Area
	1,737		5.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 10S: DA-10 OVERLAND TO SMALL POND**

Runoff = 0.27 cfs @ 12.15 hrs, Volume= 0.021 af, Depth&gt; 2.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

	Area (sf)	CN	Description
*	3,852	74	hsgC grass, open
	3,852		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 16S: NORTH WING ROOF**

Runoff = 1.43 cfs @ 12.13 hrs, Volume= 0.114 af, Depth&gt; 4.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

	Area (sf)	CN	Description
*	12,979	98	roof
	12,979		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

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**Summary for Reach 6R: Swale - runs W to N**

Inflow Area = 3.295 ac, 49.34% Impervious, Inflow Depth > 3.80" for 25-yr event  
 Inflow = 13.23 cfs @ 12.14 hrs, Volume= 1.044 af  
 Outflow = 12.96 cfs @ 12.18 hrs, Volume= 1.041 af, Atten= 2%, Lag= 2.5 min

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Max. Velocity= 4.44 fps, Min. Travel Time= 1.9 min  
 Avg. Velocity = 1.77 fps, Avg. Travel Time= 4.7 min

Peak Storage= 1,455 cf @ 12.18 hrs  
 Average Depth at Peak Storage= 0.51'  
 Bank-Full Depth= 1.50' Flow Area= 13.3 sf, Capacity= 106.43 cfs

4.00' x 1.50' deep channel, n= 0.025  
 Side Slope Z-value= 5.0 1.5 ' Top Width= 13.75'  
 Length= 500.0' Slope= 0.0200 ' / '  
 Inlet Invert= 573.00', Outlet Invert= 563.00'

**Summary for Pond 1P: Northerly POND**

Inflow Area = 4.769 ac, 59.48% Impervious, Inflow Depth > 3.97" for 25-yr event  
 Inflow = 19.67 cfs @ 12.18 hrs, Volume= 1.576 af  
 Outflow = 19.71 cfs @ 12.19 hrs, Volume= 1.483 af, Atten= 0%, Lag= 0.5 min  
 Discarded = 0.06 cfs @ 12.19 hrs, Volume= 0.045 af  
 Primary = 19.65 cfs @ 12.19 hrs, Volume= 1.438 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Peak Elev= 563.12' @ 12.19 hrs Surf.Area= 2,684 sf Storage= 4,835 cf

Plug-Flow detention time= 31.4 min calculated for 1.482 af (94% of inflow)  
 Center-of-Mass det. time= 10.2 min ( 795.6 - 785.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	559.44'	7,541 cf	<b>Northerly Pond from Swale (Prismatic) Listed below (Recalc)</b>

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
559.44	0	0	0
560.00	431	121	121
562.00	1,819	2,250	2,371
562.79	2,337	1,642	4,012
563.00	2,585	517	4,529
564.00	3,438	3,012	7,541

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Device	Routing	Invert	Outlet Devices
#1	Primary	562.78'	<b>40.0' long x 9.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.46 2.55 2.70 2.69 2.68 2.68 2.67 2.64 2.64 2.64 2.65 2.64 2.65 2.65 2.66 2.67 2.69
#2	Primary	563.30'	<b>40.0' long (Profile 29) Broad-Crested Rectangular Weir</b> Head (feet) 0.49 0.98 1.48 Coef. (English) 3.48 3.50 3.48
#3	Discarded	559.44'	<b>1.020 in/hr Exfiltration over Horizontal area</b>

**Discarded OutFlow** Max=0.06 cfs @ 12.19 hrs HW=563.11' (Free Discharge)  
 ↳ **3=Exfiltration** (Exfiltration Controls 0.06 cfs)

**Primary OutFlow** Max=19.37 cfs @ 12.19 hrs HW=563.11' (Free Discharge)  
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 19.37 cfs @ 1.45 fps)  
 ↳ **2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

**Summary for Pond 2P: Small Det. Pond**

Inflow Area = 1.435 ac, 81.68% Impervious, Inflow Depth > 4.35" for 25-yr event  
 Inflow = 6.51 cfs @ 12.17 hrs, Volume= 0.520 af  
 Outflow = 6.55 cfs @ 12.19 hrs, Volume= 0.520 af, Atten= 0%, Lag= 1.2 min  
 Primary = 5.86 cfs @ 12.19 hrs, Volume= 0.514 af  
 Secondary = 0.70 cfs @ 12.20 hrs, Volume= 0.006 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Peak Elev= 579.14' @ 12.19 hrs Surf.Area= 177 sf Storage= 262 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 0.3 min ( 779.4 - 779.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	576.21'	457 cf	<b>Small Detention Pond (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
576.21	0	0	0
577.00	56	22	22
578.00	108	82	104
579.00	162	135	239
580.00	273	218	457

Device	Routing	Invert	Outlet Devices
#1	Primary	576.21'	<b>12.0" Round Culvert to Large Pond</b> L= 49.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 576.21' / 575.71' S= 0.0102 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	579.00'	<b>120.0 deg x 5.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir</b> Cv= 2.48 (C= 3.10)

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**Primary OutFlow** Max=5.76 cfs @ 12.19 hrs HW=579.06' TW=563.11' (Dynamic Tailwater)↑**1=Culvert to Large Pond** (Barrel Controls 5.76 cfs @ 7.33 fps)**Secondary OutFlow** Max=0.70 cfs @ 12.20 hrs HW=579.12' TW=563.12' (Dynamic Tailwater)↑**2=Sharp-Crested Vee/Trap Weir** (Weir Controls 0.70 cfs @ 1.08 fps)**Summary for Pond 3P: CB IN MAIN DRIVEWAY TO ABUTTING LOT**

Inflow Area = 1.255 ac, 79.56% Impervious, Inflow Depth > 4.37" for 25-yr event  
 Inflow = 5.78 cfs @ 12.13 hrs, Volume= 0.457 af  
 Outflow = 5.78 cfs @ 12.13 hrs, Volume= 0.457 af, Atten= 0%, Lag= 0.0 min  
 Primary = 5.78 cfs @ 12.13 hrs, Volume= 0.457 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 579.80' @ 12.13 hrs

Flood Elev= 584.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	577.00'	<b>12.0" Round Culvert</b> L= 68.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 577.00' / 571.56' S= 0.0800'/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

**Primary OutFlow** Max=5.48 cfs @ 12.13 hrs HW=579.60' (Free Discharge)↑**1=Culvert** (Inlet Controls 5.48 cfs @ 6.98 fps)**Summary for Pond 8R: DMH with 15" Drainage Pipe**

Inflow Area = 0.394 ac, 94.56% Impervious, Inflow Depth > 4.55" for 25-yr event  
 Inflow = 1.88 cfs @ 12.13 hrs, Volume= 0.149 af  
 Outflow = 1.88 cfs @ 12.13 hrs, Volume= 0.149 af, Atten= 0%, Lag= 0.0 min  
 Primary = 1.88 cfs @ 12.13 hrs, Volume= 0.149 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 581.43' @ 12.26 hrs

Flood Elev= 585.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	580.38'	<b>15.0" Round Culvert</b> L= 95.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 580.38' / 579.36' S= 0.0107'/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=0.52 cfs @ 12.13 hrs HW=581.19' TW=581.15' (Dynamic Tailwater)↑**1=Culvert** (Outlet Controls 0.52 cfs @ 0.87 fps)

**Summary for Pond 11R: DMH with 15" Drainage Pipe**

Inflow Area = 0.953 ac, 83.94% Impervious, Inflow Depth > 4.40" for 25-yr event  
 Inflow = 4.41 cfs @ 12.13 hrs, Volume= 0.349 af  
 Outflow = 4.41 cfs @ 12.13 hrs, Volume= 0.349 af, Atten= 0%, Lag= 0.0 min  
 Primary = 4.41 cfs @ 12.13 hrs, Volume= 0.349 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 582.47' @ 12.13 hrs

Flood Elev= 586.35'

Device	Routing	Invert	Outlet Devices
#1	Primary	581.06'	<b>15.0" Round Culvert</b> L= 177.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 581.06' / 580.39' S= 0.0038 ' S= 0.0038 ' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=4.18 cfs @ 12.13 hrs HW=582.41' TW=581.15' (Dynamic Tailwater)

↑1=Culvert (Barrel Controls 4.18 cfs @ 3.93 fps)

**Summary for Pond 12R: DMH 12 OUT TO SMALL POND**

Inflow Area = 1.346 ac, 87.05% Impervious, Inflow Depth > 4.45" for 25-yr event  
 Inflow = 6.29 cfs @ 12.13 hrs, Volume= 0.499 af  
 Outflow = 6.26 cfs @ 12.17 hrs, Volume= 0.499 af, Atten= 1%, Lag= 2.3 min  
 Primary = 6.26 cfs @ 12.17 hrs, Volume= 0.499 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 581.33' @ 12.17 hrs Surf.Area= 46 sf Storage= 368 cf

Flood Elev= 586.31' Surf.Area= 25 sf Storage= 496 cf

Plug-Flow detention time= 1.1 min calculated for 0.493 af (99% of inflow)

Center-of-Mass det. time= 0.7 min ( 778.2 - 777.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	579.36'	87 cf	<b>4.00'D x 6.95'H Vertical Cone/Cylinder</b>
#2	579.36'	217 cf	<b>15.0" Round Pipe Storage</b> L= 177.0' S= 0.0038 ' S= 0.0038 ' Cc= 0.900
#3	579.36'	117 cf	<b>15.0" Round Pipe Storage</b> L= 95.0' S= 0.0107 ' S= 0.0107 ' Cc= 0.900
#4	580.39'	78 cf	<b>4.00'D x 6.23'H Vertical Cone/Cylinder</b>
		499 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	579.36'	<b>15.0" Round Culvert</b> L= 61.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 579.36' / 578.98' S= 0.0062 ' S= 0.0062 ' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=5.99 cfs @ 12.17 hrs HW=581.23' TW=578.99' (Dynamic Tailwater)

↑1=Culvert (Barrel Controls 5.99 cfs @ 4.88 fps)

**Summary for Subcatchment 1S: DA-1 TO CATCH BASINS**

Runoff = 1.02 cfs @ 12.13 hrs, Volume= 0.081 af, Depth> 5.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

Area (sf)	CN	Description
* 7,195	98	impervious
7,195		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 2S: DA-2 TO CATCH BASINS**

Runoff = 1.40 cfs @ 12.13 hrs, Volume= 0.111 af, Depth> 5.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

Area (sf)	CN	Description
* 9,015	98	impervious
* 932	74	hsgC grass, open
9,947	96	Weighted Average
932		9.37% Pervious Area
9,015		90.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 3S: DA-3 EASTERLY SITE TO EXISTING CATCH BASIN IN DRIVE**

Runoff = 7.52 cfs @ 12.13 hrs, Volume= 0.595 af, Depth> 5.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

Area (sf)	CN	Description
* 41,229	98	impervious
* 6,247	74	hsgC grass, open, some mulch
* 4,922	72	hsgC wooded, trees
* 2,258	98	roof
54,656	93	Weighted Average
11,169		20.44% Pervious Area
43,487		79.56% Impervious Area



**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 100-yr Rainfall=7.61"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 4S: DA-4 TO CATCH BASINS**

Runoff = 1.43 cfs @ 12.14 hrs, Volume= 0.112 af, Depth&gt; 5.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

	Area (sf)	CN	Description
*	5,894	98	impervious
*	5,182	74	hsgC grass, open
	11,076	87	Weighted Average
	5,182		46.79% Pervious Area
	5,894		53.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 5S: DA-5 TO CATCH BASINS**

Runoff = 4.29 cfs @ 12.13 hrs, Volume= 0.341 af, Depth&gt; 5.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

	Area (sf)	CN	Description
*	28,942	98	impervious
*	1,482	74	hsgC grass, open
	30,424	97	Weighted Average
	1,482		4.87% Pervious Area
	28,942		95.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 6S: DA-6 RUNOFF TO SWALE ON WEST SIDE OF LOT**

Runoff = 16.06 cfs @ 12.14 hrs, Volume= 1.265 af, Depth&gt; 5.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

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Type III 24-hr 100-yr Rainfall=7.61"

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	Area (sf)	CN	Description
*	44,913	98	impervious
*	72,726	72	hsgC wooded, trees
*	12,925	98	roof
	130,564	84	Weighted Average
	72,726		55.70% Pervious Area
	57,838		44.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 7S: DA-7 WESTERLY SLOPE TO OFFSITE**

Runoff = 2.80 cfs @ 12.14 hrs, Volume= 0.220 af, Depth&gt; 5.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

	Area (sf)	CN	Description
*	9,091	98	impervious
*	13,655	74	hsgC grass, open
	22,746	84	Weighted Average
	13,655		60.03% Pervious Area
	9,091		39.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 8S: DA-8 OVERLAND TO LOWER POND**

Runoff = 0.24 cfs @ 12.13 hrs, Volume= 0.019 af, Depth&gt; 5.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

	Area (sf)	CN	Description
*	1,702	98	impervious
	1,702		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 9S: DA-9 EASTERLY SLOPE TO OFF SITE**

Runoff = 3.23 cfs @ 12.14 hrs, Volume= 0.256 af, Depth> 4.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

	Area (sf)	CN	Description
*	1,737	98	impervious
*	13,161	74	hsgC grass, open
*	17,161	72	hsgC wooded, trees
	32,059	74	Weighted Average
	30,322		94.58% Pervious Area
	1,737		5.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 10S: DA-10 OVERLAND TO SMALL POND**

Runoff = 0.39 cfs @ 12.14 hrs, Volume= 0.031 af, Depth> 4.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

	Area (sf)	CN	Description
*	3,852	74	hsgC grass, open
	3,852		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 16S: NORTH WING ROOF**

Runoff = 1.84 cfs @ 12.13 hrs, Volume= 0.146 af, Depth> 5.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

	Area (sf)	CN	Description
*	12,979	98	roof
	12,979		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

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Type III 24-hr 100-yr Rainfall=7.61"

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**Summary for Reach 6R: Swale - runs W to N**

Inflow Area = 3.295 ac, 49.34% Impervious, Inflow Depth > 5.14" for 100-yr event  
 Inflow = 17.90 cfs @ 12.14 hrs, Volume= 1.411 af  
 Outflow = 17.52 cfs @ 12.18 hrs, Volume= 1.408 af, Atten= 2%, Lag= 2.4 min

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Max. Velocity= 4.85 fps, Min. Travel Time= 1.7 min

Avg. Velocity= 1.97 fps, Avg. Travel Time= 4.2 min

Peak Storage= 1,801 cf @ 12.18 hrs

Average Depth at Peak Storage= 0.60'

Bank-Full Depth= 1.50' Flow Area= 13.3 sf, Capacity= 106.43 cfs

4.00' x 1.50' deep channel, n= 0.025

Side Slope Z-value= 5.0 1.5 '/' Top Width= 13.75'

Length= 500.0' Slope= 0.0200 '/'

Inlet Invert= 573.00', Outlet Invert= 563.00'

**Summary for Pond 1P: Northerly POND**

Inflow Area = 4.769 ac, 59.48% Impervious, Inflow Depth > 5.29" for 100-yr event  
 Inflow = 26.38 cfs @ 12.18 hrs, Volume= 2.103 af  
 Outflow = 26.53 cfs @ 12.19 hrs, Volume= 2.010 af, Atten= 0%, Lag= 0.6 min  
 Discarded = 0.06 cfs @ 12.18 hrs, Volume= 0.046 af  
 Primary = 26.47 cfs @ 12.19 hrs, Volume= 1.964 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 563.19' @ 12.18 hrs Surf.Area= 2,744 sf Storage= 5,026 cf

Plug-Flow detention time= 23.9 min calculated for 1.988 af (95% of inflow)

Center-of-Mass det. time= 8.0 min ( 791.3 - 783.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	559.44'	7,541 cf	Northerly Pond from Swale (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
559.44	0	0	0
560.00	431	121	121
562.00	1,819	2,250	2,371
562.79	2,337	1,642	4,012
563.00	2,585	517	4,529
564.00	3,438	3,012	7,541

**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 100-yr Rainfall=7.61"

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Device	Routing	Invert	Outlet Devices
#1	Primary	562.78'	<b>40.0' long x 9.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.46 2.55 2.70 2.69 2.68 2.68 2.67 2.64 2.64 2.64 2.65 2.64 2.65 2.65 2.66 2.67 2.69
#2	Primary	563.30'	<b>40.0' long (Profile 29) Broad-Crested Rectangular Weir</b> Head (feet) 0.49 0.98 1.48 Coef. (English) 3.48 3.50 3.48
#3	Discarded	559.44'	<b>1.020 in/hr Exfiltration over Horizontal area</b>

**Discarded OutFlow** Max=0.06 cfs @ 12.18 hrs HW=563.18' (Free Discharge)  
 ↳ **3=Exfiltration** (Exfiltration Controls 0.06 cfs)

**Primary OutFlow** Max=25.69 cfs @ 12.19 hrs HW=563.18' (Free Discharge)  
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 25.69 cfs @ 1.61 fps)  
 ↳ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

**Summary for Pond 2P: Small Det. Pond**

Inflow Area = 1.435 ac, 81.68% Impervious, Inflow Depth > 5.65" for 100-yr event  
 Inflow = 8.40 cfs @ 12.15 hrs, Volume= 0.676 af  
 Outflow = 8.63 cfs @ 12.18 hrs, Volume= 0.676 af, Atten= 0%, Lag= 1.7 min  
 Primary = 6.09 cfs @ 12.16 hrs, Volume= 0.644 af  
 Secondary = 2.55 cfs @ 12.18 hrs, Volume= 0.032 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Peak Elev= 579.33' @ 12.16 hrs Surf.Area= 198 sf Storage= 298 cf

Plug-Flow detention time= 0.4 min calculated for 0.676 af (100% of inflow)  
 Center-of-Mass det. time= 0.3 min ( 778.6 - 778.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	576.21'	457 cf	<b>Small Detention Pond (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
576.21	0	0	0
577.00	56	22	22
578.00	108	82	104
579.00	162	135	239
580.00	273	218	457

Device	Routing	Invert	Outlet Devices
#1	Primary	576.21'	<b>12.0" Round Culvert to Large Pond</b> L= 49.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 576.21' / 575.71' S= 0.0102 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	579.00'	<b>120.0 deg x 5.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir</b> Cv= 2.48 (C= 3.10)

**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 100-yr Rainfall=7.61"

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**Primary OutFlow** Max=5.99 cfs @ 12.16 hrs HW=579.25' TW=563.17' (Dynamic Tailwater)  
 ↑1=Culvert to Large Pond (Barrel Controls 5.99 cfs @ 7.63 fps)

**Secondary OutFlow** Max=2.25 cfs @ 12.18 hrs HW=579.26' TW=563.18' (Dynamic Tailwater)  
 ↑2=Sharp-Crested Vee/Trap Weir (Weir Controls 2.25 cfs @ 1.56 fps)

**Summary for Pond 3P: CB IN MAIN DRIVEWAY TO ABUTTING LOT**

Inflow Area = 1.255 ac, 79.56% Impervious, Inflow Depth > 5.69" for 100-yr event  
 Inflow = 7.52 cfs @ 12.13 hrs, Volume= 0.595 af  
 Outflow = 7.52 cfs @ 12.13 hrs, Volume= 0.595 af, Atten= 0%, Lag= 0.0 min  
 Primary = 7.52 cfs @ 12.13 hrs, Volume= 0.595 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Peak Elev= 581.39' @ 12.13 hrs  
 Flood Elev= 584.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	577.00'	<b>12.0" Round Culvert</b> L= 68.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 577.00' / 571.56' S= 0.0800 ' S= 0.0800 ' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

**Primary OutFlow** Max=7.14 cfs @ 12.13 hrs HW=581.06' (Free Discharge)  
 ↑1=Culvert (Inlet Controls 7.14 cfs @ 9.08 fps)

**Summary for Pond 8R: DMH with 15" Drainage Pipe**

Inflow Area = 0.394 ac, 94.56% Impervious, Inflow Depth > 5.85" for 100-yr event  
 Inflow = 2.42 cfs @ 12.13 hrs, Volume= 0.192 af  
 Outflow = 2.42 cfs @ 12.13 hrs, Volume= 0.192 af, Atten= 0%, Lag= 0.0 min  
 Primary = 2.42 cfs @ 12.13 hrs, Volume= 0.192 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Peak Elev= 582.07' @ 12.24 hrs  
 Flood Elev= 585.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	580.38'	<b>15.0" Round Culvert</b> L= 95.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 580.38' / 579.36' S= 0.0107 ' S= 0.0107 ' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=0.00 cfs @ 12.13 hrs HW=581.52' TW=581.85' (Dynamic Tailwater)  
 ↑1=Culvert (Controls 0.00 cfs)

**189 MAY ST Fairlawn PREDEV**

Type III 24-hr 100-yr Rainfall=7.61"

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**Summary for Pond 11R: DMH with 15" Drainage Pipe**

Inflow Area = 0.953 ac, 83.94% Impervious, Inflow Depth > 5.71" for 100-yr event  
 Inflow = 5.72 cfs @ 12.13 hrs, Volume= 0.453 af  
 Outflow = 5.72 cfs @ 12.13 hrs, Volume= 0.453 af, Atten= 0%, Lag= 0.0 min  
 Primary = 5.72 cfs @ 12.13 hrs, Volume= 0.453 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 583.36' @ 12.15 hrs

Flood Elev= 586.35'

Device	Routing	Invert	Outlet Devices
#1	Primary	581.06'	<b>15.0" Round Culvert</b> L= 177.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 581.06' / 580.39' S= 0.0038 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=5.17 cfs @ 12.13 hrs HW=583.23' TW=581.85' (Dynamic Tailwater)**1=Culvert** (Outlet Controls 5.17 cfs @ 4.22 fps)**Summary for Pond 12R: DMH 12 OUT TO SMALL POND**

Inflow Area = 1.346 ac, 87.05% Impervious, Inflow Depth > 5.75" for 100-yr event  
 Inflow = 8.14 cfs @ 12.13 hrs, Volume= 0.645 af  
 Outflow = 8.01 cfs @ 12.15 hrs, Volume= 0.645 af, Atten= 2%, Lag= 1.0 min  
 Primary = 8.01 cfs @ 12.15 hrs, Volume= 0.645 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 582.00' @ 12.15 hrs Surf.Area= 25 sf Storage= 387 cf

Flood Elev= 586.31' Surf.Area= 25 sf Storage= 496 cf

Plug-Flow detention time= 1.1 min calculated for 0.639 af (99% of inflow)

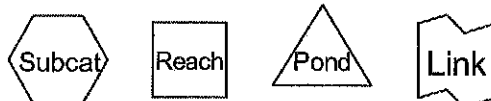
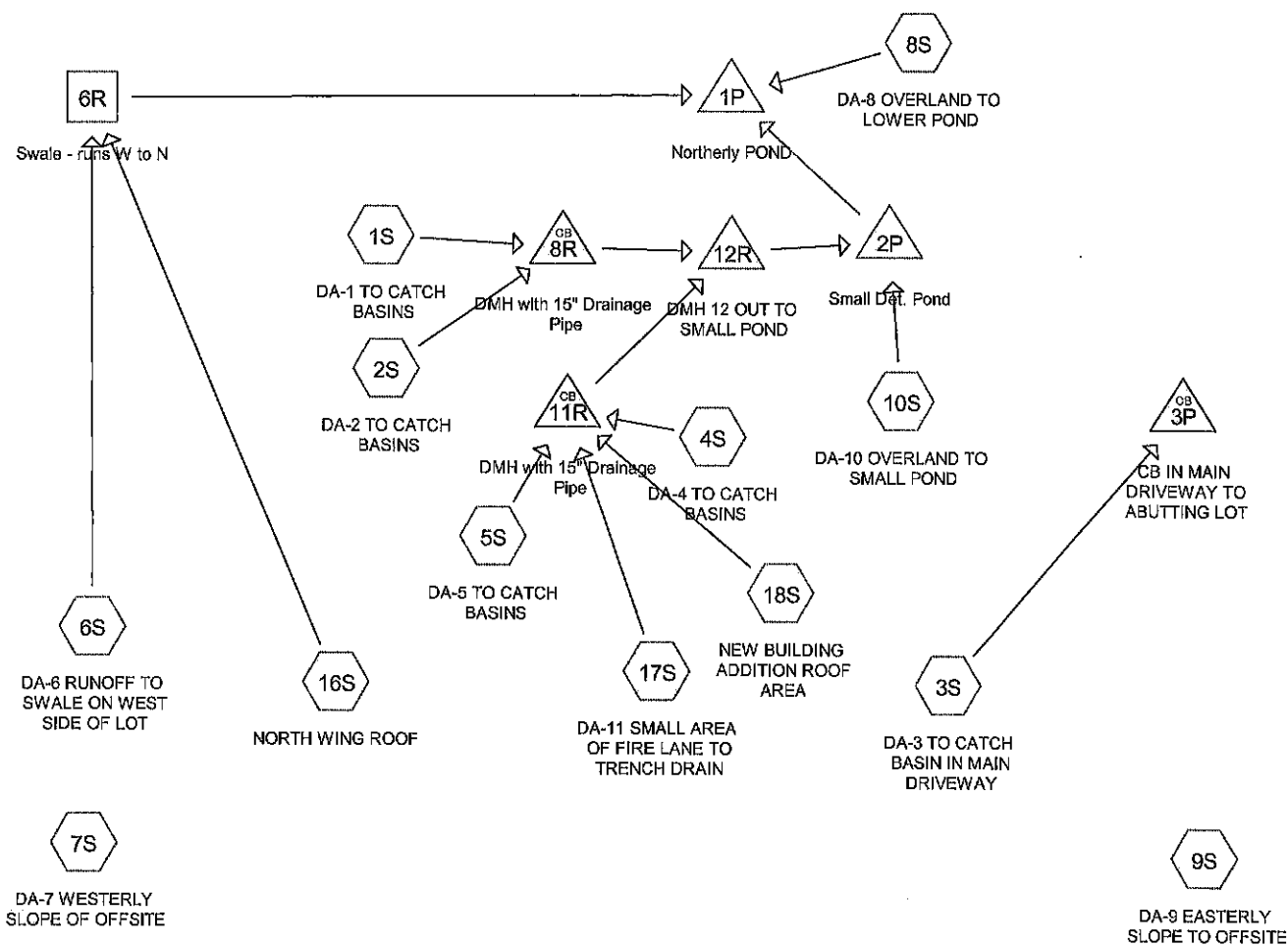
Center-of-Mass det. time= 0.7 min ( 777.6 - 776.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	579.36'	87 cf	<b>4.00'D x 6.95'H Vertical Cone/Cylinder</b>
#2	579.36'	217 cf	<b>15.0" Round Pipe Storage</b> L= 177.0' S= 0.0038 '/'
#3	579.36'	117 cf	<b>15.0" Round Pipe Storage</b> L= 95.0' S= 0.0107 '/'
#4	580.39'	78 cf	<b>4.00'D x 6.23'H Vertical Cone/Cylinder</b>
		499 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	579.36'	<b>15.0" Round Culvert</b> L= 61.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 579.36' / 578.98' S= 0.0062 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=7.61 cfs @ 12.15 hrs HW=581.85' TW=579.24' (Dynamic Tailwater)**1=Culvert** (Barrel Controls 7.61 cfs @ 6.20 fps)

## POSTDEVELOPMENT



**Routing Diagram for 189 MAY ST Fairlawn POSTDEV**  
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Type III 24-hr 2-yr Rainfall=3.14"

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**Summary for Subcatchment 1S: DA-1 TO CATCH BASINS**

Runoff = 0.42 cfs @ 12.13 hrs, Volume= 0.033 af, Depth&gt; 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

Area (sf)	CN	Description
* 7,195	98	impervious
7,195		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 2S: DA-2 TO CATCH BASINS**

Runoff = 0.55 cfs @ 12.13 hrs, Volume= 0.044 af, Depth&gt; 2.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

Area (sf)	CN	Description
* 9,015	98	impervious
* 932	74	hsgC grass, open
9,947	96	Weighted Average
932		9.37% Pervious Area
9,015		90.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 3S: DA-3 TO CATCH BASIN IN MAIN DRIVEWAY**

Runoff = 2.25 cfs @ 12.14 hrs, Volume= 0.177 af, Depth&gt; 1.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

Area (sf)	CN	Description
* 31,510	98	impervious
* 7,119	74	hsgC grass, open, some mulch
* 6,093	72	hsgC wooded, trees
* 2,258	98	roof
46,980	91	Weighted Average
13,212		28.12% Pervious Area
33,768		71.88% Impervious Area

**189 MAY ST Fairlawn POSTDEV**

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Type III 24-hr 2-yr Rainfall=3.14"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 4S: DA-4 TO CATCH BASINS**

Runoff = 0.43 cfs @ 12.14 hrs, Volume= 0.034 af, Depth&gt; 1.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

Area (sf)	CN	Description
* 5,963	98	impervious
* 4,221	74	hsgC grass, open
10,184	88	Weighted Average
4,221		41.45% Pervious Area
5,963		58.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 5S: DA-5 TO CATCH BASINS**

Runoff = 1.73 cfs @ 12.13 hrs, Volume= 0.137 af, Depth&gt; 2.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

Area (sf)	CN	Description
* 28,942	98	impervious
* 1,482	74	hsgC grass, open
30,424	97	Weighted Average
1,482		4.87% Pervious Area
28,942		95.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 6S: DA-6 RUNOFF TO SWALE ON WEST SIDE OF LOT**

Runoff = 4.46 cfs @ 12.15 hrs, Volume= 0.359 af, Depth&gt; 1.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

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Type III 24-hr 2-yr Rainfall=3.14"

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	Area (sf)	CN	Description
*	43,513	98	impervious
*	74,098	72	hsgC wooded, trees
*	12,925	98	roof
	130,536	83	Weighted Average
	74,098		56.76% Pervious Area
	56,438		43.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 7S: DA-7 WESTERLY SLOPE OF OFFSITE**

Runoff = 0.82 cfs @ 12.15 hrs, Volume= 0.065 af, Depth&gt; 1.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

	Area (sf)	CN	Description
*	9,091	98	impervious
*	13,655	74	hsgC grass, open
	22,746	84	Weighted Average
	13,655		60.03% Pervious Area
	9,091		39.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 8S: DA-8 OVERLAND TO LOWER POND**

Runoff = 0.10 cfs @ 12.13 hrs, Volume= 0.008 af, Depth&gt; 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

	Area (sf)	CN	Description
*	1,702	98	impervious
	1,702		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

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Type III 24-hr 2-yr Rainfall=3.14"

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**Summary for Subcatchment 9S: DA-9 EASTERLY SLOPE TO OFFSITE**

Runoff = 0.63 cfs @ 12.17 hrs, Volume= 0.054 af, Depth&gt; 0.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

Area (sf)	CN	Description
* 921	98	impervious
* 13,218	74	hsgC grass, open
* 17,194	72	hsgC wooded, trees
31,333	74	Weighted Average
30,412		97.06% Pervious Area
921		2.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 10S: DA-10 OVERLAND TO SMALL POND**

Runoff = 0.08 cfs @ 12.17 hrs, Volume= 0.007 af, Depth&gt; 0.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

Area (sf)	CN	Description
* 3,852	74	hsgC grass, open
3,852		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 16S: NORTH WING ROOF**

Runoff = 0.75 cfs @ 12.13 hrs, Volume= 0.059 af, Depth&gt; 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

Area (sf)	CN	Description
* 12,979	98	roof
12,979		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

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Type III 24-hr 2-yr Rainfall=3.14"

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**Summary for Subcatchment 17S: DA-11 SMALL AREA OF FIRE LANE TO TRENCH DRAIN**

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.013 af, Depth&gt; 1.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

	Area (sf)	CN	Description
*	2,311	98	impervious pav
*	1,026	74	pervious grass
	3,337	91	Weighted Average
	1,026		30.75% Pervious Area
	2,311		69.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 18S: NEW BUILDING ADDITION ROOF AREA**

Runoff = 0.42 cfs @ 12.13 hrs, Volume= 0.033 af, Depth&gt; 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 2-yr Rainfall=3.14"

	Area (sf)	CN	Description
	7,255	98	Roofs, HSG C
	7,255		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Reach 6R: Swale - runs W to N**

Inflow Area = 3.295 ac, 48.37% Impervious, Inflow Depth > 1.52" for 2-yr event  
 Inflow = 5.21 cfs @ 12.15 hrs, Volume= 0.418 af  
 Outflow = 5.11 cfs @ 12.19 hrs, Volume= 0.417 af, Atten= 2%, Lag= 2.9 min

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Max. Velocity= 3.34 fps, Min. Travel Time= 2.5 min

Avg. Velocity= 1.28 fps, Avg. Travel Time= 6.5 min

Peak Storage= 765 cf @ 12.19 hrs

Average Depth at Peak Storage= 0.31'

Bank-Full Depth= 1.50' Flow Area= 13.3 sf, Capacity= 106.43 cfs

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Type III 24-hr 2-yr Rainfall=3.14"

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4.00' x 1.50' deep channel, n= 0.025

Side Slope Z-value= 5.0 1.5 '1' Top Width= 13.75'

Length= 500.0' Slope= 0.0200 '1'

Inlet Invert= 573.00', Outlet Invert= 563.00'

**Summary for Pond 1P: Northerly POND**

Inflow Area = 4.991 ac, 60.62% Impervious, Inflow Depth > 1.74" for 2-yr event  
 Inflow = 8.71 cfs @ 12.20 hrs, Volume= 0.725 af  
 Outflow = 8.83 cfs @ 12.21 hrs, Volume= 0.632 af, Atten= 0%, Lag= 0.7 min  
 Discarded = 0.06 cfs @ 12.21 hrs, Volume= 0.042 af  
 Primary = 8.77 cfs @ 12.21 hrs, Volume= 0.590 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Peak Elev= 562.98' @ 12.21 hrs Surf.Area= 2,561 sf Storage= 4,476 cf

Plug-Flow detention time= 55.1 min calculated for 0.626 af (86% of inflow)  
 Center-of-Mass det. time= 18.5 min ( 811.6 - 793.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	559.44'	7,541 cf	<b>Northerly Pond from Swale (Prismatic) Listed below (Recalc)</b>

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
559.44	0	0	0
560.00	431	121	121
562.00	1,819	2,250	2,371
562.79	2,337	1,642	4,012
563.00	2,585	517	4,529
564.00	3,438	3,012	7,541

Device	Routing	Invert	Outlet Devices
#1	Primary	562.78'	<b>40.0' long x 9.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.46 2.55 2.70 2.69 2.68 2.68 2.67 2.64 2.64 2.64 2.65 2.64 2.65 2.65 2.66 2.67 2.69
#2	Primary	563.30'	<b>40.0' long (Profile 29) Broad-Crested Rectangular Weir</b> Head (feet) 0.49 0.98 1.48 Coef. (English) 3.48 3.50 3.48
#3	Discarded	559.44'	<b>1.020 in/hr Exfiltration over Horizontal area</b>

**Discarded OutFlow** Max=0.06 cfs @ 12.21 hrs HW=562.98' (Free Discharge)

↑ **3=Exfiltration** (Exfiltration Controls 0.06 cfs)

**Primary OutFlow** Max=8.63 cfs @ 12.21 hrs HW=562.98' (Free Discharge)

↑ **1=Broad-Crested Rectangular Weir** (Weir Controls 8.63 cfs @ 1.09 fps)

↑ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

### Summary for Pond 2P: Small Det. Pond

Inflow Area = 1.657 ac, 84.05% Impervious, Inflow Depth > 2.17" for 2-yr event  
 Inflow = 3.52 cfs @ 12.19 hrs, Volume= 0.300 af  
 Outflow = 3.51 cfs @ 12.20 hrs, Volume= 0.300 af, Atten= 0%, Lag= 0.6 min  
 Primary = 3.51 cfs @ 12.20 hrs, Volume= 0.300 af  
 Secondary = 0.00 cfs @ 10.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Peak Elev= 577.58' @ 12.20 hrs Surf.Area= 86 sf Storage= 63 cf

Plug-Flow detention time= 0.2 min calculated for 0.300 af (100% of inflow)  
 Center-of-Mass det. time= 0.2 min ( 781.8 - 781.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	576.21'	457 cf	<b>Small Detention Pond (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
576.21	0	0	0
577.00	56	22	22
578.00	108	82	104
579.00	162	135	239
580.00	273	218	457

Device	Routing	Invert	Outlet Devices
#1	Primary	576.21'	<b>12.0" Round Culvert to Large Pond</b> L= 49.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 576.21' / 575.71' S= 0.0102 ' / ' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	579.00'	<b>120.0 deg x 5.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir</b> Cv= 2.48 (C= 3.10)

**Primary OutFlow** Max=3.50 cfs @ 12.20 hrs HW=577.57' TW=562.98' (Dynamic Tailwater)

↑ **1=Culvert to Large Pond** (Barrel Controls 3.50 cfs @ 4.45 fps)

**Secondary OutFlow** Max=0.00 cfs @ 10.00 hrs HW=576.39' TW=559.71' (Dynamic Tailwater)

↑ **2=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

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**Summary for Pond 3P: CB IN MAIN DRIVEWAY TO ABUTTING LOT**

Inflow Area = 1.079 ac, 71.88% Impervious, Inflow Depth > 1.97" for 2-yr event  
 Inflow = 2.25 cfs @ 12.14 hrs, Volume= 0.177 af  
 Outflow = 2.25 cfs @ 12.14 hrs, Volume= 0.177 af, Atten= 0%, Lag= 0.0 min  
 Primary = 2.25 cfs @ 12.14 hrs, Volume= 0.177 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 577.85' @ 12.14 hrs

Flood Elev= 584.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	577.00'	<b>12.0" Round Culvert</b> L= 68.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 577.00' / 571.56' S= 0.0800 ' /' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

**Primary OutFlow** Max=2.13 cfs @ 12.14 hrs HW=577.82' (Free Discharge)**1=Culvert** (Inlet Controls 2.13 cfs @ 3.08 fps)**Summary for Pond 8R: DMH with 15" Drainage Pipe**

Inflow Area = 0.394 ac, 94.56% Impervious, Inflow Depth > 2.34" for 2-yr event  
 Inflow = 0.97 cfs @ 12.13 hrs, Volume= 0.077 af  
 Outflow = 0.97 cfs @ 12.13 hrs, Volume= 0.077 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.97 cfs @ 12.13 hrs, Volume= 0.077 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 580.96' @ 12.20 hrs

Flood Elev= 585.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	580.38'	<b>15.0" Round Culvert</b> L= 177.0' Ke= 0.500 Inlet / Outlet Invert= 580.38' / 579.71' S= 0.0038 ' /' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=0.73 cfs @ 12.13 hrs HW=580.93' TW=580.49' (Dynamic Tailwater)**1=Culvert** (Outlet Controls 0.73 cfs @ 2.05 fps)**Summary for Pond 11R: DMH with 15" Drainage Pipe**

Inflow Area = 1.175 ac, 86.86% Impervious, Inflow Depth > 2.22" for 2-yr event  
 Inflow = 2.74 cfs @ 12.14 hrs, Volume= 0.217 af  
 Outflow = 2.74 cfs @ 12.14 hrs, Volume= 0.217 af, Atten= 0%, Lag= 0.0 min  
 Primary = 2.74 cfs @ 12.14 hrs, Volume= 0.217 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 581.90' @ 12.14 hrs

Flood Elev= 586.35'

Device	Routing	Invert	Outlet Devices
#1	Primary	581.06'	<b>15.0" Round Culvert</b> L= 95.0' CPP, square edge headwall, Ke= 0.500



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Inlet / Outlet Invert= 581.06' / 580.04' S= 0.0107 ' S= 0.0107 ' Cc= 0.900  
 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=2.60 cfs @ 12.14 hrs HW=581.87' TW=580.50' (Dynamic Tailwater)  
 1=Culvert (Inlet Controls 2.60 cfs @ 3.07 fps)

**Summary for Pond 12R: DMH 12 OUT TO SMALL POND**

Inflow Area = 1.569 ac, 88.79% Impervious, Inflow Depth > 2.25" for 2-yr event  
 Inflow = 3.71 cfs @ 12.13 hrs, Volume= 0.294 af  
 Outflow = 3.45 cfs @ 12.19 hrs, Volume= 0.294 af, Atten= 7%, Lag= 3.5 min  
 Primary = 3.45 cfs @ 12.19 hrs, Volume= 0.294 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Peak Elev= 580.61' @ 12.19 hrs Surf.Area= 777 sf Storage= 362 cf  
 Flood Elev= 586.31' Surf.Area= 502 sf Storage= 2,130 cf

Plug-Flow detention time= 1.4 min calculated for 0.293 af (100% of inflow)  
 Center-of-Mass det. time= 0.9 min ( 780.7 - 779.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	579.36'	87 cf	4.00'D x 6.95'H Vertical Cone/Cylinder
#2	579.36'	459 cf	36.0" Round Pipe Storage L= 65.0' S= 0.0038 ' S= 0.0038 '
#3	579.36'	117 cf	15.0" Round Pipe Storage L= 95.0' S= 0.0107 ' S= 0.0107 '
#4	580.39'	78 cf	4.00'D x 6.23'H Vertical Cone/Cylinder
#5	580.00'	507 cf	4.00'W x 116.00'L x 4.50'H Prismatic 2,088 cf Overall - 820 cf Embedded = 1,268 cf x 40.0% Voids
#6	580.50'	820 cf	36.0" Round Pipe Storage Inside #5 L= 116.0' S= 0.0050 ' S= 0.0050 '
#7	581.06'	65 cf	4.00'D x 5.19'H Vertical Cone/Cylinder
		2,134 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	579.36'	15.0" Round Culvert L= 61.0' Ke= 0.500 Inlet / Outlet Invert= 579.36' / 578.98' S= 0.0062 ' S= 0.0062 ' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	579.36'	13.2" Vert. Orifice/Grate C= 0.600
#3	Device 2	579.35'	12.3" Vert. Orifice/Grate C= 0.600
#4	Device 2	581.40'	10.0" Vert. Orifice/Grate C= 0.600
#5	Device 2	582.00'	4.0' long x 2.50' rise Sharp-Crested Rectangular Weir 2 End Contraction(s) 3.0' Crest Height

**Primary OutFlow** Max=3.41 cfs @ 12.19 hrs HW=580.60' TW=577.56' (Dynamic Tailwater)

1=Culvert (Passes 3.41 cfs of 4.17 cfs potential flow)  
 2=Orifice/Grate (Passes 3.41 cfs of 3.80 cfs potential flow)  
 3=Orifice/Grate (Orifice Controls 3.41 cfs @ 4.13 fps)  
 4=Orifice/Grate ( Controls 0.00 cfs)  
 5=Sharp-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Subcatchment 1S: DA-1 TO CATCH BASINS**

Runoff = 0.65 cfs @ 12.13 hrs, Volume= 0.052 af, Depth> 3.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

Area (sf)	CN	Description
* 7,195	98	impervious
7,195		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 2S: DA-2 TO CATCH BASINS**

Runoff = 0.88 cfs @ 12.13 hrs, Volume= 0.070 af, Depth> 3.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

Area (sf)	CN	Description
* 9,015	98	impervious
* 932	74	hsgC grass, open
9,947	96	Weighted Average
932		9.37% Pervious Area
9,015		90.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 3S: DA-3 TO CATCH BASIN IN MAIN DRIVEWAY**

Runoff = 3.85 cfs @ 12.14 hrs, Volume= 0.303 af, Depth> 3.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

Area (sf)	CN	Description
* 31,510	98	impervious
* 7,119	74	hsgC grass, open, some mulch
* 6,093	72	hsgC wooded, trees
* 2,258	98	roof
46,980	91	Weighted Average
13,212		28.12% Pervious Area
33,768		71.88% Impervious Area

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Type III 24-hr 10-yr Rainfall=4.87"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 4S: DA-4 TO CATCH BASINS**

Runoff = 0.78 cfs @ 12.14 hrs, Volume= 0.062 af, Depth&gt; 3.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

Area (sf)	CN	Description
* 5,963	98	impervious
* 4,221	74	hsgC grass, open
10,184	88	Weighted Average
4,221		41.45% Pervious Area
5,963		58.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 5S: DA-5 TO CATCH BASINS**

Runoff = 2.73 cfs @ 12.13 hrs, Volume= 0.216 af, Depth&gt; 3.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

Area (sf)	CN	Description
* 28,942	98	impervious
* 1,482	74	hsgC grass, open
30,424	97	Weighted Average
1,482		4.87% Pervious Area
28,942		95.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 6S: DA-6 RUNOFF TO SWALE ON WEST SIDE OF LOT**

Runoff = 8.76 cfs @ 12.14 hrs, Volume= 0.694 af, Depth&gt; 2.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

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Type III 24-hr 10-yr Rainfall=4.87"

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	Area (sf)	CN	Description
*	43,513	98	impervious
*	74,098	72	hsgC wooded, trees
*	12,925	98	roof
	130,536	83	Weighted Average
	74,098		56.76% Pervious Area
	56,438		43.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 7S: DA-7 WESTERLY SLOPE OF OFFSITE**

Runoff = 1.57 cfs @ 12.14 hrs, Volume= 0.124 af, Depth&gt; 2.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

	Area (sf)	CN	Description
*	9,091	98	impervious
*	13,655	74	hsgC grass, open
	22,746	84	Weighted Average
	13,655		60.03% Pervious Area
	9,091		39.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 8S: DA-8 OVERLAND TO LOWER POND**

Runoff = 0.15 cfs @ 12.13 hrs, Volume= 0.012 af, Depth&gt; 3.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

	Area (sf)	CN	Description
*	1,702	98	impervious
	1,702		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

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Type III 24-hr 10-yr Rainfall=4.87"

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**Summary for Subcatchment 9S: DA-9 EASTERLY SLOPE TO OFFSITE**

Runoff = 1.54 cfs @ 12.15 hrs, Volume= 0.125 af, Depth&gt; 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

	Area (sf)	CN	Description
*	921	98	impervious
*	13,218	74	hsgC grass, open
*	17,194	72	hsgC wooded, trees
	31,333	74	Weighted Average
	30,412		97.06% Pervious Area
	921		2.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 10S: DA-10 OVERLAND TO SMALL POND**

Runoff = 0.19 cfs @ 12.15 hrs, Volume= 0.015 af, Depth&gt; 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

	Area (sf)	CN	Description
*	3,852	74	hsgC grass, open
	3,852		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 16S: NORTH WING ROOF**

Runoff = 1.17 cfs @ 12.13 hrs, Volume= 0.093 af, Depth&gt; 3.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

	Area (sf)	CN	Description
*	12,979	98	roof
	12,979		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

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Type III 24-hr 10-yr Rainfall=4.87"

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**Summary for Subcatchment 17S: DA-11 SMALL AREA OF FIRE LANE TO TRENCH DRAIN**

Runoff = 0.27 cfs @ 12.14 hrs, Volume= 0.022 af, Depth&gt; 3.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

	Area (sf)	CN	Description
*	2,311	98	impervious pav
*	1,026	74	pervious grass
	3,337	91	Weighted Average
	1,026		30.75% Pervious Area
	2,311		69.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 18S: NEW BUILDING ADDITION ROOF AREA**

Runoff = 0.66 cfs @ 12.13 hrs, Volume= 0.052 af, Depth&gt; 3.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 10-yr Rainfall=4.87"

	Area (sf)	CN	Description
	7,255	98	Roofs, HSG C
	7,255		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Reach 6R: Swale - runs W to N**

Inflow Area = 3.295 ac, 48.37% Impervious, Inflow Depth > 2.87" for 10-yr event  
 Inflow = 9.93 cfs @ 12.14 hrs, Volume= 0.787 af  
 Outflow = 9.75 cfs @ 12.18 hrs, Volume= 0.784 af, Atten= 2%, Lag= 2.6 min

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Max. Velocity= 4.08 fps, Min. Travel Time= 2.0 min  
 Avg. Velocity= 1.60 fps, Avg. Travel Time= 5.2 min

Peak Storage= 1,193 cf @ 12.18 hrs  
 Average Depth at Peak Storage= 0.44'  
 Bank-Full Depth= 1.50' Flow Area= 13.3 sf, Capacity= 106.43 cfs

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4.00' x 1.50' deep channel, n= 0.025

Side Slope Z-value= 5.0 1.5 ' Top Width= 13.75'

Length= 500.0' Slope= 0.0200 ' /'

Inlet Invert= 573.00', Outlet Invert= 563.00'

**Summary for Pond 1P: Northerly POND**

Inflow Area = 4.991 ac, 60.62% Impervious, Inflow Depth > 3.09" for 10-yr event  
 Inflow = 15.09 cfs @ 12.20 hrs, Volume= 1.285 af  
 Outflow = 15.15 cfs @ 12.20 hrs, Volume= 1.192 af, Atten= 0%, Lag= 0.6 min  
 Discarded = 0.06 cfs @ 12.20 hrs, Volume= 0.044 af  
 Primary = 15.09 cfs @ 12.20 hrs, Volume= 1.148 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Peak Elev= 563.06' @ 12.20 hrs Surf.Area= 2,639 sf Storage= 4,695 cf

Plug-Flow detention time= 35.5 min calculated for 1.179 af (92% of inflow)  
 Center-of-Mass det. time= 12.0 min ( 799.8 - 787.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	559.44'	7,541 cf	<b>Northerly Pond from Swale (Prismatic) Listed below (Recalc)</b>

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
559.44	0	0	0
560.00	431	121	121
562.00	1,819	2,250	2,371
562.79	2,337	1,642	4,012
563.00	2,585	517	4,529
564.00	3,438	3,012	7,541

Device	Routing	Invert	Outlet Devices
#1	Primary	562.78'	<b>40.0' long x 9.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.46 2.55 2.70 2.69 2.68 2.68 2.67 2.64 2.64 2.64 2.65 2.64 2.65 2.65 2.66 2.67 2.69
#2	Primary	563.30'	<b>40.0' long (Profile 29) Broad-Crested Rectangular Weir</b> Head (feet) 0.49 0.98 1.48 Coef. (English) 3.48 3.50 3.48
#3	Discarded	559.44'	<b>1.020 in/hr Exfiltration over Horizontal area</b>

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**Discarded OutFlow** Max=0.06 cfs @ 12.20 hrs HW=563.06' (Free Discharge)↑**3=Exfiltration** (Exfiltration Controls 0.06 cfs)**Primary OutFlow** Max=14.96 cfs @ 12.20 hrs HW=563.06' (Free Discharge)↑**1=Broad-Crested Rectangular Weir** (Weir Controls 14.96 cfs @ 1.33 fps)↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)**Summary for Pond 2P: Small Det. Pond**

Inflow Area = 1.657 ac, 84.05% Impervious, Inflow Depth > 3.53" for 10-yr event  
 Inflow = 5.43 cfs @ 12.21 hrs, Volume= 0.488 af  
 Outflow = 5.32 cfs @ 12.24 hrs, Volume= 0.488 af, Atten= 2%, Lag= 1.6 min  
 Primary = 5.32 cfs @ 12.24 hrs, Volume= 0.488 af  
 Secondary = 0.00 cfs @ 10.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 578.70' @ 12.24 hrs Surf.Area= 146 sf Storage= 193 cf

Plug-Flow detention time= 0.3 min calculated for 0.483 af (99% of inflow)

Center-of-Mass det. time= 0.2 min ( 780.2 - 780.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	576.21'	457 cf	<b>Small Detention Pond (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
576.21	0	0	0
577.00	56	22	22
578.00	108	82	104
579.00	162	135	239
580.00	273	218	457

Device	Routing	Invert	Outlet Devices
#1	Primary	576.21'	<b>12.0" Round Culvert to Large Pond</b> L= 49.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 576.21' / 575.71' S= 0.0102 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	579.00'	<b>120.0 deg x 5.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir</b> Cv= 2.48 (C= 3.10)

**Primary OutFlow** Max=5.19 cfs @ 12.24 hrs HW=578.62' TW=563.05' (Dynamic Tailwater)↑**1=Culvert to Large Pond** (Barrel Controls 5.19 cfs @ 6.61 fps)**Secondary OutFlow** Max=0.00 cfs @ 10.00 hrs HW=576.45' TW=559.81' (Dynamic Tailwater)↑**2=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)



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**Summary for Pond 3P: CB IN MAIN DRIVEWAY TO ABUTTING LOT**

Inflow Area = 1.079 ac, 71.88% Impervious, Inflow Depth > 3.37" for 10-yr event  
 Inflow = 3.85 cfs @ 12.14 hrs, Volume= 0.303 af  
 Outflow = 3.85 cfs @ 12.14 hrs, Volume= 0.303 af, Atten= 0%, Lag= 0.0 min  
 Primary = 3.85 cfs @ 12.14 hrs, Volume= 0.303 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 578.52' @ 12.13 hrs

Flood Elev= 584.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	577.00'	<b>12.0" Round Culvert</b> L= 68.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 577.00' / 571.56' S= 0.0800' /' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

**Primary OutFlow** Max=3.64 cfs @ 12.14 hrs HW=578.43' (Free Discharge)**↑1=Culvert** (Inlet Controls 3.64 cfs @ 4.64 fps)**Summary for Pond 8R: DMH with 15" Drainage Pipe**

Inflow Area = 0.394 ac, 94.56% Impervious, Inflow Depth > 3.70" for 10-yr event  
 Inflow = 1.53 cfs @ 12.13 hrs, Volume= 0.121 af  
 Outflow = 1.53 cfs @ 12.13 hrs, Volume= 0.121 af, Atten= 0%, Lag= 0.0 min  
 Primary = 1.53 cfs @ 12.13 hrs, Volume= 0.121 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 581.61' @ 12.30 hrs

Flood Elev= 585.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	580.38'	<b>15.0" Round Culvert</b> L= 177.0' Ke= 0.500 Inlet / Outlet Invert= 580.38' / 579.71' S= 0.0038' /' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=0.00 cfs @ 12.13 hrs HW=581.19' TW=581.24' (Dynamic Tailwater)**↑1=Culvert** ( Controls 0.00 cfs)**Summary for Pond 11R: DMH with 15" Drainage Pipe**

Inflow Area = 1.175 ac, 86.86% Impervious, Inflow Depth > 3.59" for 10-yr event  
 Inflow = 4.44 cfs @ 12.13 hrs, Volume= 0.351 af  
 Outflow = 4.44 cfs @ 12.13 hrs, Volume= 0.351 af, Atten= 0%, Lag= 0.0 min  
 Primary = 4.44 cfs @ 12.13 hrs, Volume= 0.351 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 582.23' @ 12.13 hrs

Flood Elev= 586.35'

Device	Routing	Invert	Outlet Devices
#1	Primary	581.06'	<b>15.0" Round Culvert</b> L= 95.0' CPP, square edge headwall, Ke= 0.500

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Inlet / Outlet Invert= 581.06' / 580.04' S= 0.0107 ' S= 0.0107 ' Cc= 0.900  
 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=3.96 cfs @ 12.13 hrs HW=582.19' TW=581.24' (Dynamic Tailwater)  
 1=Culvert (Outlet Controls 3.96 cfs @ 4.49 fps)

**Summary for Pond 12R: DMH 12 OUT TO SMALL POND**

Inflow Area = 1.569 ac, 88.79% Impervious, Inflow Depth > 3.62" for 10-yr event  
 Inflow = 5.97 cfs @ 12.13 hrs, Volume= 0.473 af  
 Outflow = 5.26 cfs @ 12.21 hrs, Volume= 0.473 af, Atten= 12%, Lag= 4.6 min  
 Primary = 5.26 cfs @ 12.21 hrs, Volume= 0.473 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Peak Elev= 581.55' @ 12.21 hrs Surf.Area= 684 sf Storage= 891 cf  
 Flood Elev= 586.31' Surf.Area= 502 sf Storage= 2,130 cf

Plug-Flow detention time= 1.7 min calculated for 0.472 af (100% of inflow)  
 Center-of-Mass det. time= 1.3 min ( 779.2 - 777.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	579.36'	87 cf	4.00'D x 6.95'H Vertical Cone/Cylinder
#2	579.36'	459 cf	36.0" Round Pipe Storage L= 65.0' S= 0.0038 ' S= 0.0038 '
#3	579.36'	117 cf	15.0" Round Pipe Storage L= 95.0' S= 0.0107 ' S= 0.0107 '
#4	580.39'	78 cf	4.00'D x 6.23'H Vertical Cone/Cylinder
#5	580.00'	507 cf	4.00'W x 116.00'L x 4.50'H Prismatic 2,088 cf Overall - 820 cf Embedded = 1,268 cf x 40.0% Voids
#6	580.50'	820 cf	36.0" Round Pipe Storage Inside #5 L= 116.0' S= 0.0050 ' S= 0.0050 '
#7	581.06'	65 cf	4.00'D x 5.19'H Vertical Cone/Cylinder
		2,134 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	579.36'	15.0" Round Culvert L= 61.0' Ke= 0.500 Inlet / Outlet Invert= 579.36' / 578.98' S= 0.0062 ' S= 0.0062 ' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	579.36'	13.2" Vert. Orifice/Grate C= 0.600
#3	Device 2	579.35'	12.3" Vert. Orifice/Grate C= 0.600
#4	Device 2	581.40'	10.0" Vert. Orifice/Grate C= 0.600
#5	Device 2	582.00'	4.0' long x 2.50' rise Sharp-Crested Rectangular Weir 2 End Contraction(s) 3.0' Crest Height

**Primary OutFlow** Max=5.17 cfs @ 12.21 hrs HW=581.52' TW=578.64' (Dynamic Tailwater)  
 1=Culvert (Passes 5.17 cfs of 6.79 cfs potential flow)  
 2=Orifice/Grate (Passes 5.17 cfs of 5.80 cfs potential flow)  
 3=Orifice/Grate (Orifice Controls 5.11 cfs @ 6.19 fps)  
 4=Orifice/Grate (Orifice Controls 0.05 cfs @ 1.17 fps)  
 5=Sharp-Crested Rectangular Weir ( Controls 0.00 cfs)

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**Summary for Subcatchment 1S: DA-1 TO CATCH BASINS**

Runoff = 0.80 cfs @ 12.13 hrs, Volume= 0.063 af, Depth&gt; 4.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

Area (sf)	CN	Description
* 7,195	98	impervious
7,195		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 2S: DA-2 TO CATCH BASINS**

Runoff = 1.09 cfs @ 12.13 hrs, Volume= 0.086 af, Depth&gt; 4.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

Area (sf)	CN	Description
* 9,015	98	impervious
* 932	74	hsgC grass, open
9,947	96	Weighted Average
932		9.37% Pervious Area
9,015		90.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 3S: DA-3 TO CATCH BASIN IN MAIN DRIVEWAY**

Runoff = 4.84 cfs @ 12.14 hrs, Volume= 0.381 af, Depth&gt; 4.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

Area (sf)	CN	Description
* 31,510	98	impervious
* 7,119	74	hsgC grass, open, some mulch
* 6,093	72	hsgC wooded, trees
* 2,258	98	roof
46,980	91	Weighted Average
13,212		28.12% Pervious Area
33,768		71.88% Impervious Area

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Type III 24-hr 25-yr Rainfall=5.95"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 4S: DA-4 TO CATCH BASINS**

Runoff = 1.00 cfs @ 12.14 hrs, Volume= 0.079 af, Depth&gt; 4.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

	Area (sf)	CN	Description
*	5,963	98	impervious
*	4,221	74	hsgC grass, open
	10,184	88	Weighted Average
	4,221		41.45% Pervious Area
	5,963		58.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 5S: DA-5 TO CATCH BASINS**

Runoff = 3.35 cfs @ 12.13 hrs, Volume= 0.266 af, Depth&gt; 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

	Area (sf)	CN	Description
*	28,942	98	impervious
*	1,482	74	hsgC grass, open
	30,424	97	Weighted Average
	1,482		4.87% Pervious Area
	28,942		95.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 6S: DA-6 RUNOFF TO SWALE ON WEST SIDE OF LOT**

Runoff = 11.53 cfs @ 12.14 hrs, Volume= 0.909 af, Depth&gt; 3.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

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Type III 24-hr 25-yr Rainfall=5.95"

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	Area (sf)	CN	Description
*	43,513	98	impervious
*	74,098	72	hsgC wooded, trees
*	12,925	98	roof
	130,536	83	Weighted Average
	74,098		56.76% Pervious Area
	56,438		43.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 7S: DA-7 WESTERLY SLOPE OF OFFSITE**

Runoff = 2.05 cfs @ 12.14 hrs, Volume= 0.162 af, Depth&gt; 3.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

	Area (sf)	CN	Description
*	9,091	98	impervious
*	13,655	74	hsgC grass, open
	22,746	84	Weighted Average
	13,655		60.03% Pervious Area
	9,091		39.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 8S: DA-8 OVERLAND TO LOWER POND**

Runoff = 0.19 cfs @ 12.13 hrs, Volume= 0.015 af, Depth&gt; 4.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

	Area (sf)	CN	Description
*	1,702	98	impervious
	1,702		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

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Type III 24-hr 25-yr Rainfall=5.95"

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**Summary for Subcatchment 9S: DA-9 EASTERLY SLOPE TO OFFSITE**

Runoff = 2.16 cfs @ 12.15 hrs, Volume= 0.173 af, Depth&gt; 2.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

Area (sf)	CN	Description
* 921	98	impervious
* 13,218	74	hsgC grass, open
* 17,194	72	hsgC wooded, trees
31,333	74	Weighted Average
30,412		97.06% Pervious Area
921		2.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 10S: DA-10 OVERLAND TO SMALL POND**

Runoff = 0.27 cfs @ 12.15 hrs, Volume= 0.021 af, Depth&gt; 2.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

Area (sf)	CN	Description
* 3,852	74	hsgC grass, open
3,852		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 16S: NORTH WING ROOF**

Runoff = 1.43 cfs @ 12.13 hrs, Volume= 0.114 af, Depth&gt; 4.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

Area (sf)	CN	Description
* 12,979	98	roof
12,979		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

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Type III 24-hr 25-yr Rainfall=5.95"

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**Summary for Subcatchment 17S: DA-11 SMALL AREA OF FIRE LANE TO TRENCH DRAIN**

Runoff = 0.34 cfs @ 12.14 hrs, Volume= 0.027 af, Depth&gt; 4.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

	Area (sf)	CN	Description
*	2,311	98	impervious pav
*	1,026	74	pervious grass
	3,337	91	Weighted Average
	1,026		30.75% Pervious Area
	2,311		69.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 18S: NEW BUILDING ADDITION ROOF AREA**

Runoff = 0.80 cfs @ 12.13 hrs, Volume= 0.064 af, Depth&gt; 4.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 25-yr Rainfall=5.95"

	Area (sf)	CN	Description
	7,255	98	Roofs, HSG C
	7,255		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Reach 6R: Swale - runs W to N**

Inflow Area = 3.295 ac, 48.37% Impervious, Inflow Depth > 3.73" for 25-yr event  
 Inflow = 12.96 cfs @ 12.14 hrs, Volume= 1.023 af  
 Outflow = 12.71 cfs @ 12.18 hrs, Volume= 1.021 af, Atten= 2%, Lag= 2.5 min

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Max. Velocity= 4.42 fps, Min. Travel Time= 1.9 min

Avg. Velocity= 1.76 fps, Avg. Travel Time= 4.7 min

Peak Storage= 1,435 cf @ 12.18 hrs

Average Depth at Peak Storage= 0.51'

Bank-Full Depth= 1.50' Flow Area= 13.3 sf, Capacity= 106.43 cfs

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Type III 24-hr 25-yr Rainfall=5.95"

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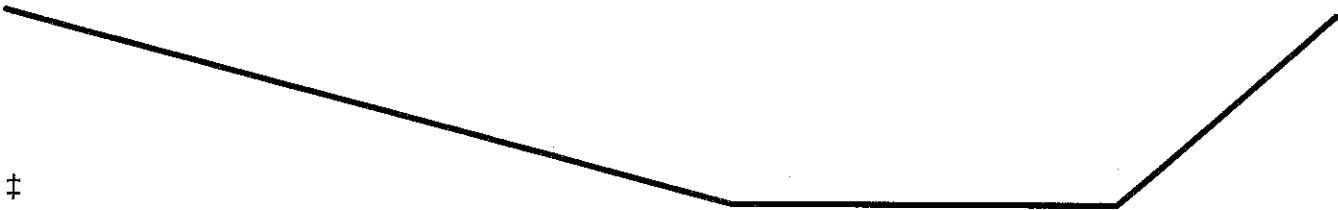
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4.00' x 1.50' deep channel, n= 0.025

Side Slope Z-value= 5.0 1.5 '1' Top Width= 13.75'

Length= 500.0' Slope= 0.0200 '1'

Inlet Invert= 573.00', Outlet Invert= 563.00'

**Summary for Pond 1P: Northerly POND**

Inflow Area = 4.991 ac, 60.62% Impervious, Inflow Depth > 3.95" for 25-yr event  
 Inflow = 19.68 cfs @ 12.19 hrs, Volume= 1.641 af  
 Outflow = 19.67 cfs @ 12.20 hrs, Volume= 1.548 af, Atten= 0%, Lag= 0.5 min  
 Discarded = 0.06 cfs @ 12.20 hrs, Volume= 0.045 af  
 Primary = 19.61 cfs @ 12.20 hrs, Volume= 1.503 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 563.12' @ 12.20 hrs Surf.Area= 2,684 sf Storage= 4,834 cf

Plug-Flow detention time= 30.4 min calculated for 1.547 af (94% of inflow)

Center-of-Mass det. time= 9.9 min ( 795.7 - 785.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	559.44'	7,541 cf	Northerly Pond from Swale (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
559.44	0	0	0
560.00	431	121	121
562.00	1,819	2,250	2,371
562.79	2,337	1,642	4,012
563.00	2,585	517	4,529
564.00	3,438	3,012	7,541

Device	Routing	Invert	Outlet Devices
#1	Primary	562.78'	<b>40.0' long x 9.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.46 2.55 2.70 2.69 2.68 2.68 2.67 2.64 2.64 2.64 2.65 2.64 2.65 2.65 2.66 2.67 2.69
#2	Primary	563.30'	<b>40.0' long (Profile 29) Broad-Crested Rectangular Weir</b> Head (feet) 0.49 0.98 1.48 Coef. (English) 3.48 3.50 3.48
#3	Discarded	559.44'	<b>1.020 in/hr Exfiltration over Horizontal area</b>



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Type III 24-hr 25-yr Rainfall=5.95"

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**Discarded OutFlow** Max=0.06 cfs @ 12.20 hrs HW=563.11' (Free Discharge)

↑3=Exfiltration (Exfiltration Controls 0.06 cfs)

**Primary OutFlow** Max=19.53 cfs @ 12.20 hrs HW=563.11' (Free Discharge)

↑1=Broad-Crested Rectangular Weir (Weir Controls 19.53 cfs @ 1.46 fps)

↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

**Summary for Pond 2P: Small Det. Pond**

Inflow Area = 1.657 ac, 84.05% Impervious, Inflow Depth > 4.38" for 25-yr event  
 Inflow = 7.02 cfs @ 12.21 hrs, Volume= 0.605 af  
 Outflow = 6.93 cfs @ 12.22 hrs, Volume= 0.605 af, Atten= 1%, Lag= 0.7 min  
 Primary = 5.95 cfs @ 12.24 hrs, Volume= 0.595 af  
 Secondary = 1.01 cfs @ 12.21 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 579.21' @ 12.24 hrs Surf.Area= 185 sf Storage= 276 cf

Plug-Flow detention time= 0.4 min calculated for 0.605 af (100% of inflow)

Center-of-Mass det. time= 0.3 min ( 779.7 - 779.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	576.21'	457 cf	<b>Small Detention Pond (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
576.21	0	0	0
577.00	56	22	22
578.00	108	82	104
579.00	162	135	239
580.00	273	218	457

Device	Routing	Invert	Outlet Devices
#1	Primary	576.21'	<b>12.0" Round Culvert to Large Pond</b> L= 49.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 576.21' / 575.71' S= 0.0102 ' S= 0.0102 ' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	579.00'	<b>120.0 deg x 5.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir</b> Cv= 2.48 (C= 3.10)

**Primary OutFlow** Max=5.84 cfs @ 12.24 hrs HW=579.12' TW=563.10' (Dynamic Tailwater)

↑1=Culvert to Large Pond (Barrel Controls 5.84 cfs @ 7.43 fps)

**Secondary OutFlow** Max=0.93 cfs @ 12.21 hrs HW=579.15' TW=563.11' (Dynamic Tailwater)

↑2=Sharp-Crested Vee/Trap Weir (Weir Controls 0.93 cfs @ 1.19 fps)

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Type III 24-hr 25-yr Rainfall=5.95"

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**Summary for Pond 3P: CB IN MAIN DRIVEWAY TO ABUTTING LOT**

Inflow Area = 1.079 ac, 71.88% Impervious, Inflow Depth > 4.24" for 25-yr event  
 Inflow = 4.84 cfs @ 12.14 hrs, Volume= 0.381 af  
 Outflow = 4.84 cfs @ 12.14 hrs, Volume= 0.381 af, Atten= 0%, Lag= 0.0 min  
 Primary = 4.84 cfs @ 12.14 hrs, Volume= 0.381 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 579.11' @ 12.13 hrs

Flood Elev= 584.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	577.00'	<b>12.0" Round Culvert</b> L= 68.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 577.00' / 571.56' S= 0.0800 ' S= 0.0800 ' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

**Primary OutFlow** Max=4.58 cfs @ 12.14 hrs HW=578.97' (Free Discharge)**1=Culvert** (Inlet Controls 4.58 cfs @ 5.84 fps)**Summary for Pond 8R: DMH with 15" Drainage Pipe**

Inflow Area = 0.394 ac, 94.56% Impervious, Inflow Depth > 4.55" for 25-yr event  
 Inflow = 1.88 cfs @ 12.13 hrs, Volume= 0.149 af  
 Outflow = 1.88 cfs @ 12.13 hrs, Volume= 0.149 af, Atten= 0%, Lag= 0.0 min  
 Primary = 1.88 cfs @ 12.13 hrs, Volume= 0.149 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 582.16' @ 12.30 hrs

Flood Elev= 585.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	580.38'	<b>15.0" Round Culvert</b> L= 177.0' Ke= 0.500 Inlet / Outlet Invert= 580.38' / 579.71' S= 0.0038 ' S= 0.0038 ' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=0.00 cfs @ 12.13 hrs HW=581.41' TW=581.72' (Dynamic Tailwater)**1=Culvert** (Controls 0.00 cfs)**Summary for Pond 11R: DMH with 15" Drainage Pipe**

Inflow Area = 1.175 ac, 86.86% Impervious, Inflow Depth > 4.44" for 25-yr event  
 Inflow = 5.49 cfs @ 12.13 hrs, Volume= 0.435 af  
 Outflow = 5.49 cfs @ 12.13 hrs, Volume= 0.435 af, Atten= 0%, Lag= 0.0 min  
 Primary = 5.49 cfs @ 12.13 hrs, Volume= 0.435 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 582.50' @ 12.10 hrs

Flood Elev= 586.35'

Device	Routing	Invert	Outlet Devices
#1	Primary	581.06'	<b>15.0" Round Culvert</b> L= 95.0' CPP, square edge headwall, Ke= 0.500

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Inlet / Outlet Invert= 581.06' / 580.04' S= 0.0107 ' S= 0.900  
n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=4.56 cfs @ 12.13 hrs HW=582.49' TW=581.72' (Dynamic Tailwater)  
 ↑1=Culvert (Outlet Controls 4.56 cfs @ 4.08 fps)

**Summary for Pond 12R: DMH 12 OUT TO SMALL POND**

Inflow Area = 1.569 ac, 88.79% Impervious, Inflow Depth > 4.47" for 25-yr event  
 Inflow = 7.37 cfs @ 12.13 hrs, Volume= 0.584 af  
 Outflow = 6.78 cfs @ 12.21 hrs, Volume= 0.584 af, Atten= 8%, Lag= 4.5 min  
 Primary = 6.78 cfs @ 12.21 hrs, Volume= 0.584 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Peak Elev= 582.10' @ 12.21 hrs Surf.Area= 631 sf Storage= 1,207 cf  
 Flood Elev= 586.31' Surf.Area= 502 sf Storage= 2,130 cf

Plug-Flow detention time= 1.9 min calculated for 0.584 af (100% of inflow)  
 Center-of-Mass det. time= 1.5 min ( 778.7 - 777.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	579.36'	87 cf	4.00'D x 6.95'H Vertical Cone/Cylinder
#2	579.36'	459 cf	36.0" Round Pipe Storage L= 65.0' S= 0.0038 ' S= 0.900
#3	579.36'	117 cf	15.0" Round Pipe Storage L= 95.0' S= 0.0107 ' S= 0.900
#4	580.39'	78 cf	4.00'D x 6.23'H Vertical Cone/Cylinder
#5	580.00'	507 cf	4.00'W x 116.00'L x 4.50'H Prismatoid 2,088 cf Overall - 820 cf Embedded = 1,268 cf x 40.0% Voids
#6	580.50'	820 cf	36.0" Round Pipe Storage Inside #5 L= 116.0' S= 0.0050 ' S= 0.900
#7	581.06'	65 cf	4.00'D x 5.19'H Vertical Cone/Cylinder
		2,134 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	579.36'	15.0" Round Culvert L= 61.0' Ke= 0.500 Inlet / Outlet Invert= 579.36' / 578.98' S= 0.0062 ' S= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	579.36'	13.2" Vert. Orifice/Grate C= 0.600
#3	Device 2	579.35'	12.3" Vert. Orifice/Grate C= 0.600
#4	Device 2	581.40'	10.0" Vert. Orifice/Grate C= 0.600
#5	Device 2	582.00'	4.0' long x 2.50' rise Sharp-Crested Rectangular Weir 2 End Contraction(s) 3.0' Crest Height

**Primary OutFlow** Max=6.71 cfs @ 12.21 hrs HW=582.06' TW=579.15' (Dynamic Tailwater)

↑1=Culvert (Passes 6.71 cfs of 8.10 cfs potential flow)  
 ↑2=Orifice/Grate (Orifice Controls 6.71 cfs @ 7.06 fps)  
 ↑3=Orifice/Grate (Passes < 5.89 cfs potential flow)  
 ↑4=Orifice/Grate (Passes < 1.29 cfs potential flow)  
 ↑5=Sharp-Crested Rectangular Weir (Passes < 0.20 cfs potential flow)

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**Summary for Subcatchment 1S: DA-1 TO CATCH BASINS**

Runoff = 1.02 cfs @ 12.13 hrs, Volume= 0.081 af, Depth&gt; 5.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

Area (sf)	CN	Description
* 7,195	98	impervious
7,195		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 2S: DA-2 TO CATCH BASINS**

Runoff = 1.40 cfs @ 12.13 hrs, Volume= 0.111 af, Depth&gt; 5.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

Area (sf)	CN	Description
* 9,015	98	impervious
* 932	74	hsgC grass, open
9,947	96	Weighted Average
932		9.37% Pervious Area
9,015		90.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 3S: DA-3 TO CATCH BASIN IN MAIN DRIVEWAY**

Runoff = 6.34 cfs @ 12.13 hrs, Volume= 0.501 af, Depth&gt; 5.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

Area (sf)	CN	Description
* 31,510	98	impervious
* 7,119	74	hsgC grass, open, some mulch
* 6,093	72	hsgC wooded, trees
* 2,258	98	roof
46,980	91	Weighted Average
13,212		28.12% Pervious Area
33,768		71.88% Impervious Area

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Type III 24-hr 100-yr Rainfall=7.61"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 4S: DA-4 TO CATCH BASINS**

Runoff = 1.33 cfs @ 12.14 hrs, Volume= 0.105 af, Depth&gt; 5.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

Area (sf)	CN	Description
* 5,963	98	impervious
* 4,221	74	hsgC grass, open
10,184	88	Weighted Average
4,221		41.45% Pervious Area
5,963		58.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 5S: DA-5 TO CATCH BASINS**

Runoff = 4.29 cfs @ 12.13 hrs, Volume= 0.341 af, Depth&gt; 5.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

Area (sf)	CN	Description
* 28,942	98	impervious
* 1,482	74	hsgC grass, open
30,424	97	Weighted Average
1,482		4.87% Pervious Area
28,942		95.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 6S: DA-6 RUNOFF TO SWALE ON WEST SIDE OF LOT**

Runoff = 15.79 cfs @ 12.14 hrs, Volume= 1.244 af, Depth&gt; 4.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

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	Area (sf)	CN	Description
*	43,513	98	impervious
*	74,098	72	hsgC wooded, trees
*	12,925	98	roof
	130,536	83	Weighted Average
	74,098		56.76% Pervious Area
	56,438		43.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 7S: DA-7 WESTERLY SLOPE OF OFFSITE**

Runoff = 2.80 cfs @ 12.14 hrs, Volume= 0.220 af, Depth&gt; 5.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

	Area (sf)	CN	Description
*	9,091	98	impervious
*	13,655	74	hsgC grass, open
	22,746	84	Weighted Average
	13,655		60.03% Pervious Area
	9,091		39.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 8S: DA-8 OVERLAND TO LOWER POND**

Runoff = 0.24 cfs @ 12.13 hrs, Volume= 0.019 af, Depth&gt; 5.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

	Area (sf)	CN	Description
*	1,702	98	impervious
	1,702		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

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Type III 24-hr 100-yr Rainfall=7.61"

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**Summary for Subcatchment 9S: DA-9 EASTERLY SLOPE TO OFFSITE**

Runoff = 3.15 cfs @ 12.14 hrs, Volume= 0.250 af, Depth&gt; 4.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

Area (sf)	CN	Description
* 921	98	impervious
* 13,218	74	hsgC grass, open
* 17,194	72	hsgC wooded, trees
31,333	74	Weighted Average
30,412		97.06% Pervious Area
921		2.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 10S: DA-10 OVERLAND TO SMALL POND**

Runoff = 0.39 cfs @ 12.14 hrs, Volume= 0.031 af, Depth&gt; 4.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

Area (sf)	CN	Description
* 3,852	74	hsgC grass, open
3,852		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 16S: NORTH WING ROOF**

Runoff = 1.84 cfs @ 12.13 hrs, Volume= 0.146 af, Depth&gt; 5.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

Area (sf)	CN	Description
* 12,979	98	roof
12,979		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**189 MAY ST Fairlawn POSTDEV**

Type III 24-hr 100-yr Rainfall=7.61"

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**Summary for Subcatchment 17S: DA-11 SMALL AREA OF FIRE LANE TO TRENCH DRAIN**

Runoff = 0.45 cfs @ 12.13 hrs, Volume= 0.036 af, Depth&gt; 5.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

	Area (sf)	CN	Description
*	2,311	98	impervious pav
*	1,026	74	pervious grass
	3,337	91	Weighted Average
	1,026		30.75% Pervious Area
	2,311		69.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Subcatchment 18S: NEW BUILDING ADDITION ROOF AREA**

Runoff = 1.03 cfs @ 12.13 hrs, Volume= 0.082 af, Depth&gt; 5.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=7.61"

	Area (sf)	CN	Description
	7,255	98	Roofs, HSG C
	7,255		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Summary for Reach 6R: Swale - runs W to N**

Inflow Area = 3.295 ac, 48.37% Impervious, Inflow Depth > 5.06" for 100-yr event  
 Inflow = 17.63 cfs @ 12.14 hrs, Volume= 1.390 af  
 Outflow = 17.27 cfs @ 12.18 hrs, Volume= 1.387 af, Atten= 2%, Lag= 2.4 min

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Max. Velocity= 4.83 fps, Min. Travel Time= 1.7 min

Avg. Velocity= 1.96 fps, Avg. Travel Time= 4.3 min

Peak Storage= 1,782 cf @ 12.18 hrs

Average Depth at Peak Storage= 0.60'

Bank-Full Depth= 1.50' Flow Area= 13.3 sf, Capacity= 106.43 cfs



**189 MAY ST Fairlawn POSTDEV**

Type III 24-hr 100-yr Rainfall=7.61"

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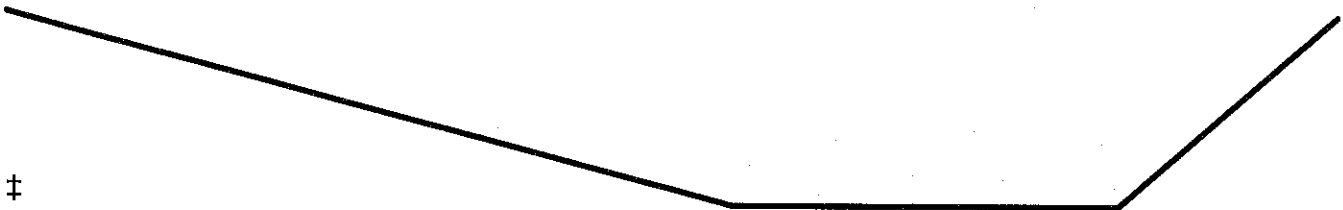
Page 34

4.00' x 1.50' deep channel, n= 0.025

Side Slope Z-value= 5.0 1.5 ' ' Top Width= 13.75'

Length= 500.0' Slope= 0.0200 ' '

Inlet Invert= 573.00', Outlet Invert= 563.00'

**Summary for Pond 1P: Northerly POND**

Inflow Area = 4.991 ac, 60.62% Impervious, Inflow Depth > 5.27" for 100-yr event  
 Inflow = 26.48 cfs @ 12.19 hrs, Volume= 2.192 af  
 Outflow = 26.54 cfs @ 12.20 hrs, Volume= 2.099 af, Atten= 0%, Lag= 0.5 min  
 Discarded = 0.06 cfs @ 12.20 hrs, Volume= 0.046 af  
 Primary = 26.47 cfs @ 12.20 hrs, Volume= 2.053 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 563.19' @ 12.20 hrs Surf.Area= 2,744 sf Storage= 5,026 cf

Plug-Flow detention time= 23.1 min calculated for 2.076 af (95% of inflow)

Center-of-Mass det. time= 7.8 min ( 791.5 - 783.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	559.44'	7,541 cf	<b>Northerly Pond from Swale (Prismatic) Listed below (Recalc)</b>

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
559.44	0	0	0
560.00	431	121	121
562.00	1,819	2,250	2,371
562.79	2,337	1,642	4,012
563.00	2,585	517	4,529
564.00	3,438	3,012	7,541

Device	Routing	Invert	Outlet Devices
#1	Primary	562.78'	<b>40.0' long x 9.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.46 2.55 2.70 2.69 2.68 2.68 2.67 2.64 2.64 2.64 2.65 2.64 2.65 2.65 2.66 2.67 2.69
#2	Primary	563.30'	<b>40.0' long (Profile 29) Broad-Crested Rectangular Weir</b> Head (feet) 0.49 0.98 1.48 Coef. (English) 3.48 3.50 3.48
#3	Discarded	559.44'	<b>1.020 in/hr Exfiltration over Horizontal area</b>

**189 MAY ST Fairlawn POSTDEV**

Type III 24-hr 100-yr Rainfall=7.61"

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**Discarded OutFlow** Max=0.06 cfs @ 12.20 hrs HW=563.18' (Free Discharge)↑ **3=Exfiltration** (Exfiltration Controls 0.06 cfs)**Primary OutFlow** Max=26.28 cfs @ 12.20 hrs HW=563.18' (Free Discharge)↑ **1=Broad-Crested Rectangular Weir** (Weir Controls 26.28 cfs @ 1.62 fps)↑ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)**Summary for Pond 2P: Small Det. Pond**

Inflow Area = 1.657 ac, 84.05% Impervious, Inflow Depth > 5.69" for 100-yr event  
 Inflow = 8.71 cfs @ 12.21 hrs, Volume= 0.786 af  
 Outflow = 9.12 cfs @ 12.21 hrs, Volume= 0.786 af, Atten= 0%, Lag= 0.0 min  
 Primary = 6.07 cfs @ 12.21 hrs, Volume= 0.739 af  
 Secondary = 3.05 cfs @ 12.21 hrs, Volume= 0.047 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 579.32' @ 12.21 hrs Surf.Area= 198 sf Storage= 297 cf

Plug-Flow detention time= 0.4 min calculated for 0.778 af (99% of inflow)

Center-of-Mass det. time= 0.3 min ( 779.2 - 778.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	576.21'	457 cf	<b>Small Detention Pond (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
576.21	0	0	0
577.00	56	22	22
578.00	108	82	104
579.00	162	135	239
580.00	273	218	457

Device	Routing	Invert	Outlet Devices
#1	Primary	576.21'	<b>12.0" Round Culvert to Large Pond</b> L= 49.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 576.21' / 575.71' S= 0.0102 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	579.00'	<b>120.0 deg x 5.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir</b> Cv= 2.48 (C= 3.10)

**Primary OutFlow** Max=6.06 cfs @ 12.21 hrs HW=579.31' TW=563.18' (Dynamic Tailwater)↑ **1=Culvert to Large Pond** (Barrel Controls 6.06 cfs @ 7.71 fps)**Secondary OutFlow** Max=2.88 cfs @ 12.21 hrs HW=579.31' TW=563.18' (Dynamic Tailwater)↑ **2=Sharp-Crested Vee/Trap Weir** (Weir Controls 2.88 cfs @ 1.69 fps)

**Summary for Pond 3P: CB IN MAIN DRIVEWAY TO ABUTTING LOT**

Inflow Area = 1.079 ac, 71.88% Impervious, Inflow Depth > 5.58" for 100-yr event  
 Inflow = 6.34 cfs @ 12.13 hrs, Volume= 0.501 af  
 Outflow = 6.34 cfs @ 12.13 hrs, Volume= 0.501 af, Atten= 0%, Lag= 0.0 min  
 Primary = 6.34 cfs @ 12.13 hrs, Volume= 0.501 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 580.27' @ 12.13 hrs

Flood Elev= 584.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	577.00'	<b>12.0" Round Culvert</b> L= 68.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 577.00' / 571.56' S= 0.0800 ' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

**Primary OutFlow** Max=6.02 cfs @ 12.13 hrs HW=580.03' (Free Discharge)

↑1=Culvert (Inlet Controls 6.02 cfs @ 7.66 fps)

**Summary for Pond 8R: DMH with 15" Drainage Pipe**

Inflow Area = 0.394 ac, 94.56% Impervious, Inflow Depth > 5.85" for 100-yr event  
 Inflow = 2.42 cfs @ 12.13 hrs, Volume= 0.192 af  
 Outflow = 2.42 cfs @ 12.13 hrs, Volume= 0.192 af, Atten= 0%, Lag= 0.0 min  
 Primary = 2.42 cfs @ 12.13 hrs, Volume= 0.192 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 583.35' @ 12.31 hrs

Flood Elev= 585.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	580.38'	<b>15.0" Round Culvert</b> L= 177.0' Ke= 0.500 Inlet / Outlet Invert= 580.38' / 579.71' S= 0.0038 ' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=0.00 cfs @ 12.13 hrs HW=581.85' TW=582.54' (Dynamic Tailwater)

↑1=Culvert ( Controls 0.00 cfs)

**Summary for Pond 11R: DMH with 15" Drainage Pipe**

Inflow Area = 1.175 ac, 86.86% Impervious, Inflow Depth > 5.75" for 100-yr event  
 Inflow = 7.10 cfs @ 12.13 hrs, Volume= 0.563 af  
 Outflow = 7.10 cfs @ 12.13 hrs, Volume= 0.563 af, Atten= 0%, Lag= 0.0 min  
 Primary = 7.10 cfs @ 12.13 hrs, Volume= 0.563 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs

Peak Elev= 583.94' @ 12.27 hrs

Flood Elev= 586.35'

Device	Routing	Invert	Outlet Devices
#1	Primary	581.06'	<b>15.0" Round Culvert</b> L= 95.0' CPP, square edge headwall, Ke= 0.500

**189 MAY ST Fairlawn POSTDEV**

Type III 24-hr 100-yr Rainfall=7.61"

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Inlet / Outlet Invert= 581.06' / 580.04' S= 0.0107 ' S= 0.0107 ' Cc= 0.900  
 n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=4.46 cfs @ 12.13 hrs HW=583.24' TW=582.55' (Dynamic Tailwater)  
 1=Culvert (Outlet Controls 4.46 cfs @ 3.64 fps)

**Summary for Pond 12R: DMH 12 OUT TO SMALL POND**

Inflow Area = 1.569 ac, 88.79% Impervious, Inflow Depth > 5.78" for 100-yr event  
 Inflow = 9.52 cfs @ 12.13 hrs, Volume= 0.755 af  
 Outflow = 8.36 cfs @ 12.21 hrs, Volume= 0.755 af, Atten= 12%, Lag= 4.7 min  
 Primary = 8.36 cfs @ 12.21 hrs, Volume= 0.755 af

Routing by Dyn-Stor-Ind method, Time Span= 10.00-20.00 hrs, dt= 0.10 hrs  
 Peak Elev= 583.25' @ 12.21 hrs Surf.Area= 502 sf Storage= 1,721 cf  
 Flood Elev= 586.31' Surf.Area= 502 sf Storage= 2,130 cf

Plug-Flow detention time= 2.1 min calculated for 0.747 af (99% of inflow)  
 Center-of-Mass det. time= 1.7 min ( 778.3 - 776.7 )

Volume	Invert	Avail. Storage	Storage Description
#1	579.36'	87 cf	4.00'D x 6.95'H Vertical Cone/Cylinder
#2	579.36'	459 cf	36.0" Round Pipe Storage L= 65.0' S= 0.0038 ' S= 0.0038 '
#3	579.36'	117 cf	15.0" Round Pipe Storage L= 95.0' S= 0.0107 ' S= 0.0107 '
#4	580.39'	78 cf	4.00'D x 6.23'H Vertical Cone/Cylinder
#5	580.00'	507 cf	4.00'W x 116.00'L x 4.50'H Prismatic 2,088 cf Overall - 820 cf Embedded = 1,268 cf x 40.0% Voids
#6	580.50'	820 cf	36.0" Round Pipe Storage Inside #5 L= 116.0' S= 0.0050 ' S= 0.0050 '
#7	581.06'	65 cf	4.00'D x 5.19'H Vertical Cone/Cylinder
		2,134 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	579.36'	15.0" Round Culvert L= 61.0' Ke= 0.500 Inlet / Outlet Invert= 579.36' / 578.98' S= 0.0062 ' S= 0.0062 ' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	579.36'	13.2" Vert. Orifice/Grate C= 0.600
#3	Device 2	579.35'	12.3" Vert. Orifice/Grate C= 0.600
#4	Device 2	581.40'	10.0" Vert. Orifice/Grate C= 0.600
#5	Device 2	582.00'	4.0' long x 2.50' rise Sharp-Crested Rectangular Weir 2 End Contraction(s) 3.0' Crest Height

**Primary OutFlow** Max=8.25 cfs @ 12.21 hrs HW=583.16' TW=579.31' (Dynamic Tailwater)  
 1=Culvert (Passes 8.25 cfs of 10.23 cfs potential flow)  
 2=Orifice/Grate (Orifice Controls 8.25 cfs @ 8.68 fps)  
 3=Orifice/Grate (Passes < 7.21 cfs potential flow)  
 4=Orifice/Grate (Passes < 3.04 cfs potential flow)  
 5=Sharp-Crested Rectangular Weir (Passes < 16.10 cfs potential flow)



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TRUSTEES OF  
CLARK UNIVERSITY  
51-014-00002

### PREDEVELOPMENT DRAINAGE AREAS





189 MAY STREET  
NEW ENGLAND REHABILITATION  
WDRD BOOK 13501 PAGE 193  
ASRS MBL 51-014-00025  
LOT AREA 20.68 ACRES±

**ZONING COMPLIANCE TABLE:**  
ZONING DISTRICT: IN-H

	REQUIRED OR ALLOWED	EXISTING	PROVIDED
LOT AREA	N/A	900,820	900,820 S.F.
LOT FRONTAGE	N/A	513.02'	513.02'
FRONT YARD	15'	372.6'	433.1'
SIDE YARD	10'	40'	26'
REAR YARD	10'	418.8'	418.8'
HEIGHT (STY)	N/A	4 STORY	4 STORY
HEIGHT (FT.)	N/A	45±	45±
GROSS FLOOR AREA (S.F.)	N/A	97,469	122,509
FLOOR AREA RATIO	N/A	0.11:1	0.14:1

PROPOSED USE: HOSPITAL

**PARKING CALCULATIONS EXISTING & PROPOSED CONDITIONS:**

	REQ'D	EXISTING	PROPOSED
HOSPITAL PARKING REQUIREMENTS			
110 BEDS X 1 SPACE PER BED	110		
OUTPATIENT PHYSICAL THERAPY			
8 EXAM ROOMS X 3 SPACES PER RM	24		
ADDITIONAL SPACES NEEDED FOR SHIFT OVERLAP AND VISITORS	110		
TOTAL PARKING	244	280	251

OF THOSE,

# WHEELCHAIR ACCESSIBLE SPACES	7	12	9
OF THOSE, # VAN ACCESSIBLE	1	9	6
#ELECTRIC VEHICLE SPACES PROVIDED	0	0	6

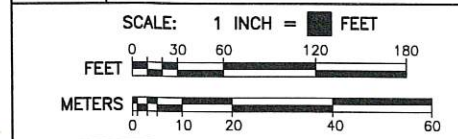
LOADING SPACES

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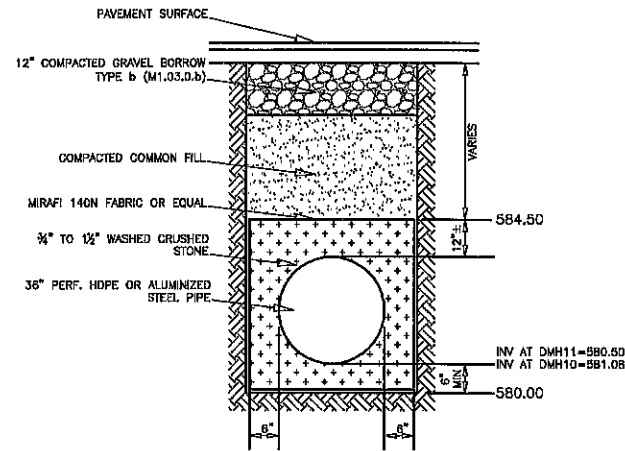
EXISTING CONDITION: IMPERVIOUS 204,717 SQ. FT. (22.72%)  
PROPOSED CONDITION: IMPERVIOUS 204,694 SQ. FT. (22.72%)

**THOMPSON-LISTON ASSOCIATES, INC.**  
Professional Engineers Professional Land Surveyors  
Erosion Control Specialists  
51 Main Street, Post Office Box 570, Boylston, MA 01505  
Telephone 508-869-6151 www.thompsonliston.com

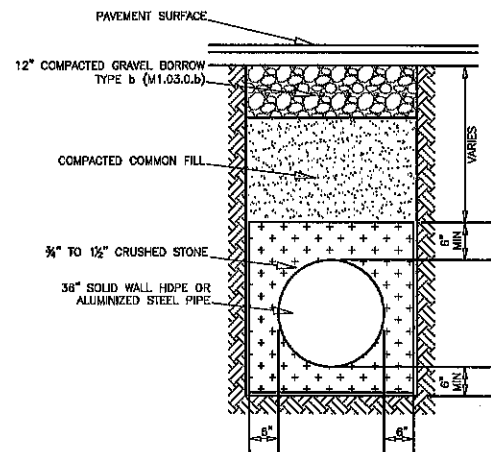
CLT. NO.	JOB NO.
3368	348-1876
DATE:	DWG NO.
AUGUST 3, 2021	SITE PLAN 6-6-21
REVISIONS	
DATE:	DESCRIPTION



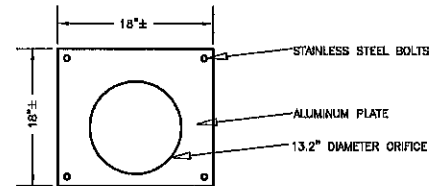
DEFINITIVE SITE PLAN OF LAND AT  
189 MAY STREET  
WORCESTER, MASSACHUSETTS  
OWNED BY:  
NEW ENGLAND REHABILITATION  
WDRD BOOK 13501 PAGE 193  
ASRS MBL 51-014-00025  
POSTDEVELOPMENT DRAINAGE AREAS



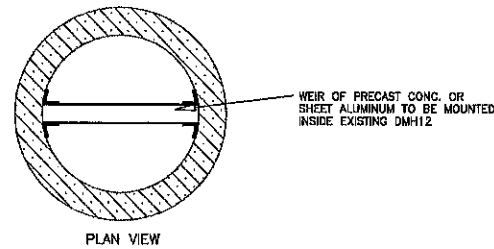
DETAIL OF 36" SUBSURFACE  
DETENTION PIPE FROM  
DMH10 TO DMH11  
NOT TO SCALE



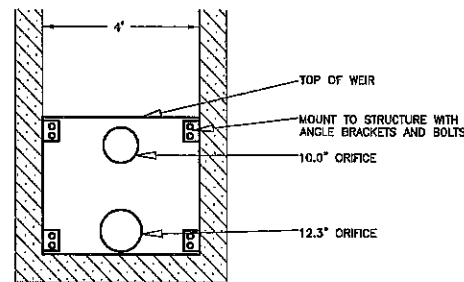
DETAIL OF 36" DRAIN PIPE  
FROM DMH11 TO DMH12  
NOT TO SCALE



DETAIL OF ORIFICE PLATE AT  
DMH12 OUTLET  
NOT TO SCALE



PLAN VIEW



SECTION VIEW

SHOP DRAWINGS TO BE  
SUBMITTED TO ENGINEER  
PRIOR TO MANUFACTURING

DETAIL OF OUTLET CONTROL  
WEIR AT DMH12  
NOT TO SCALE

#### NOTES:

1. THE MATERIALS, METHODS, AND WORKMANSHIP OF ALL SEWER, DRAIN, AND WATER PIPES PROPOSED HEREON, INCLUDING ALL WORK WITHIN THE PUBLIC STREETS, TRENCHES AND PAVEMENT PATCHES, SHALL COMPLY WITH THE STANDARD DETAILS AND SPECIFICATIONS OF THE WORCESTER DEPARTMENT OF PUBLIC WORKS.
2. UNLESS OTHERWISE NOTED, THE CONSTRUCTION MATERIALS DESCRIBED HEREIN REFER TO THE MASSACHUSETTS DOT, HIGHWAY DEPARTMENT, SPECIFICATIONS FOR HIGHWAYS AND BRIDGES.
3. PAVEMENT REPAIRS IN THE DRIVE AISLES SHALL BE HOT MIX ASPHALT CONCRETE, TYPE I, 1-1/2" TOP COURSE 3/4" AGGREGATE, OVER 2-1/2" DENSE BINDER, INTERMEDIATE AGGREGATE. (M3.11.00)
3. PAVEMENT REPAIRS WITHIN PARKING SPACES SHALL BE HOT MIX ASPHALT CONCRETE, TYPE I, 1" TOP COURSE 3/4" AGGREGATE, OVER 2" DENSE BINDER, INTERMEDIATE AGGREGATE. (M3.11.00)
4. FLOWABLE FILL IN ROAD TRENCHES SHALL MEET THE REQUIREMENTS OF THE CITY OF WORCESTER DEPARTMENT OF PUBLIC WORKS.
5. CEMENT CONCRETE SHALL BE 4,000 PSI, 3/4" AGGREGATE, MIN 610 LBS CEMENT PER CY (M4.02.00)
6. REFER TO LANDSCAPE DRAWINGS FOR SOIL PREPARATION, PLANTINGS, SEED MIX, AND DENSE MIX SURFACING SPECIFICATIONS.
7. DRAINAGE PIPE SHALL BE DR18PVC FROM CATCH BASIN TO MANHOLE AND REINFORCED CONCRETE PIPE ELSEWHERE.
8. SANITARY SEWER PIPE OUTSIDE THE BUILDING ENVELOPE SHALL BE SDR35 PVC. CONNECTIONS TO EXISTING SERVICE SHALL BE MADE IN THE MANNER AND WITH MATERIALS ACCEPTABLE TO THE WORCESTER DPW.
9. FIRE PROTECTION WATER SERVICE SHALL BE INSIDE THE BUILDING.
10. DOMESTIC WATER SERVICE SHALL BE INSIDE THE BUILDING.
11. TRASH AND RECYCLABLES WILL BE STORED IN CLOSED CONTAINERS IN THE EXISTING LOADING AREA.
12. ALL TREES AND SHRUBS PLANTED SHALL BE ASIAN LONGHORNED BEETLE AND EMERALD ASH BORER RESISTANT VARIETIES.
13. THE IMPERVIOUS AREA IS APPROXIMATELY XXXXX S.F. IN THE EXISTING CONDITION AND APPROXIMATELY XXXXX S.F. IN THE PROPOSED.

#### THOMPSON-LISTON ASSOCIATES, INC.

Professional Engineers Professional Land Surveyors  
Erosion Control Specialists

51 Main Street, Post Office Box 570, Boylston, MA 01505  
Telephone 508-869-6151 www.thompsonliston.com

CLT. NO.	JOB NO.
3368	348-1876
DATE:	DWG NO.
AUGUST 3, 2021	SITE PLAN 6-6-21

DATE:	REVISIONS DESCRIPTION

DEFINITIVE SITE PLAN OF LAND AT  
189 MAY STREET  
WORCESTER, MASSACHUSETTS  
OWNED BY:  
NEW ENGLAND REHABILITATION  
WDRD BOOK 13501 PAGE 193  
ASRS MBL 51-014-00025